BENGAL SECRETARIAT LIBRARY

FLORA OF BRITISH INDIA.

ORDER CXVII. CHENOPODIACEÆ.

Herbs or shrubs. *Leaves* simple, alternate, exstipulate. *Flowers* 1–2-sexual, small, usually regular, often dimorphic; bracts 1–3, or 0. *Calyx* inferior of 3–5 free or connate sepals, imbricate in bud. *Petals* 0. *Stamens* usually 5, opposite the sepals, perigynous or hypogynous; anthers 2-celled. *Ovary* ovoid, globose or depressed, 1-celled; stigma 2–4; ovule solitary, basal or lateral, campylotropous. *Fruit* usually a utricle enclosed in the often enlarged fleshy calyx. *Seeds* horizontal or vertical, testa crustaceous, coriaceous or membranous; albumen floury fleshy or 0; embryo curved, annular or spiral.—Genera 80; species about 520, natives of all climates.

Three genera of the Tribe *Camphorosmeæ* are so characteristic of Affghan or Soongarian vegetation, that they may be expected to occur within the Indian frontier; they are *Camphorosma*, with an unequally 3–5-toothed compressed not tubercled perianth; *Panderia*, with an equally 5-lobed tubercled perianth; and *Kirilowia* with an equally 5-toothed smooth perianth.

Suborder I. CHENOPODIEÆ. *Stem* not twining. *Bracteoles* free from the perianth. *Anthers* erect or incurved in bud.

Series I. CYCLOLOBEÆ. *Embryo* annular or horseshoe-like; albumen copious (0 in *Salicornia*).

Tribe I. **Euchenopodieæ.** *Stem* not jointed. *Flowers* clustered, all similar. *Leaves* flat. *Stamens* perigynous. *Embryo* usually annular.

Utricle dehiscent . . . . 1. ACROGLOCHIN.
Utricle indehiscent. Perianth 5-partite . . . . 2. CHENOPODIUM.
Utricle indehiscent. Perianth 5-lobed, base thickened . . . 3. BETA.

Tribe 2. **Atripliceæ.** *Stem* not jointed. *Flowers* dimorphic; ♂ ebracteolate, 3–5-lobed or parted; ♀ usually without perianth and enclosed in 2 free or connate bracts, except *Spinacia*. *Stamens* perigynous. *Testa* crustaceous or coriaceous; embryo annular.

Fl. ♀ ebracteolate. Perianth 3–4-toothed . . . . 4. SPINACIA.
Fl. ♀ bracteoles flat, edges united or not . . . . 5. ATRIPLEX.
Fl. ♀ bracteoles conduplicate, edges united . . . . 6. EUROTIA.

Tribe 3. **Camphorosmeæ.** *Stem* not jointed. *Flowers* all similar, bracteolate or 0. *Stamens* hypogynous. *Utricle* naked or enclosed in the unaltered perianth. *Testa* membranous, adhering to the copious albumen; embryo horseshoe-formed.

Sepals 3–5. Utricle crested above . . . . 7. AXYRIS.
Sepals 3–5 united, of ♀ 0. Utricle crested above . . . . 8. MICROGYNŒCIUM.

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Tribe 4. **Corispermeæ.** *Stem* not jointed. *Flowers* 2-sexual. *Fruit* exserted from the perianth. *Seed* erect, compressed; testa membranous, adhering to the copious albumen; embryo annular.

Fruit unarmed, hidden by the large bracts . . . . 9. CORISPERMUM.

Tribe 5. **Chenoleeæ.** *Stem* not jointed. *Flowers* all similar. *Utricle* included in the usually enlarged perianth. *Stamens* hypogynous. *Seed* usually horizontal; testa membranous or coriaceous, adhering to the scanty albumen; embryo annular.

Fruiting perianth with simple or spinescent lobes . . . 10. CHENOLEA.
Fruiting perianth with transverse wings . . . . 11. KOCHIA.

Tribe 6. **Salicornieæ.** *Stem* fleshy, usually jointed. *Flowers* 2-sexual, immersed in cavities of the joints or between the scales of a fleshy cone. *Testa* crustaceous, fleshy or membranous.

Seed with fleshy albumen; embryo semi-annular . . . . 12. ARTHROCNEMUM.
Seed exalbuminous; embryo conduplicate . . . . 13. SALICORNIA.

Series 2. SPIROLOBEÆ. *Embryo* spiral; albumen scanty or 0.

Tribe 7. **Suædeæ.** *Utricle* enclosed in the simply enlarged perianth. *Stem* not jointed.

Perianth 5-lobed. Leaves linear fleshy . . . . 14. SUÆDA.

Tribe 8. **Salsoleæ.** *Utricle* enclosed in the transversely winged perianth. *Stem* jointed or not.

* *Seed horizontal. Sepals dorsally winged.*

Stem jointed . . . . 15. HALOXYLON.
Stem not jointed . . . . 16. SALSOLA.

** *Seed vertical. Sepals dorsally winged or not.*

Seed dorsally compressed. Stem jointed . . . . 17. ANABASIS.
Seed laterally compressed. Sepals not winged. Anthers appendaged . . . . 18. HALOCHARIS.
Seed laterally compressed. Sepals winged. Anthers simple 19. HALOGETON.

Suborder II. BASELLEÆ. *Stem twining. Bracteoles* 2, broad, adnate to the face of the perianth. *Filaments* straight or recurved in bud.

Filaments straight in bud. Embryo spiral . . . . . . 20. BASELLA.

1. ACROGLOCHIN, *Schrad.*

An erect, strict, glabrous annual. *Leaves* alternate. *Flowers* minute, sessile, clustered in the axils of short axillary cymes, subtended by needle-like sterile branches; bracts and bracteoles 0. *Sepals* 5, subacute, [illegible] *Stamens* 1–5, filaments dilated below. *Ovary* depressed; style [illegible] stigmas 2 subulate; ovule erect. *Utricle* disciform, depressed, circumsciss. *Seed* horizontal, testa black shining, albumen floury; embryo annular.

A. chenopodioides, *Schrad. Cat. Hort. Gött.* 182[illegible]. A. Schraderianus, *Schultes Herb.* A. persicarioides, *Moq. in DC. Prodr.* xiii. 2. 25[illegible]

Amarantus persicarioides, *Poir. Dict. Suppl.* i. 311. A. cauliflorus, *Link Enum. Hort. Berol.* ii. 389. A. diandrus, *Spreng. Neue Entd.* iii. 20. A. persicarioides and A. acroglochin, *Spreng. Syst.* i. 927. Lecanocarpus cauliflorus *Nees Pl. Hort. Bonn.* 4, t. 2. L. nepalensis, *Fisch. mss.* Blitanthus nepalensis, *Reichb. Cat. Hort. Dresd.* 1824.

WESTERN HIMALAYA; from Kashmir, alt. 8–5000 ft., to Kumaon and ? Nepal. KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.*—DISTRIB. Yunan.

Stem 1–2 ft.; branches 0 or short, erecto-patent, strict. *Leaves* 1–2½ in., obtuse or acute, lobulate and erose; petiole ½–1 in. *Cymes* shorter than the leaves, ½ in. long and broad, branches rigid spreading. *Flowers* about 1/10 in. diam., green.

2. CHENOPODIUM, *Linn.*

Erect or prostrate herbs. *Stem* angled. *Leaves* alternate, entire lobed or toothed. *Flowers* minute, 2-sexual, in axillary clusters or cymes. *Sepals* 3–5. *Stamens* 1–5. *Disk* 0. *Ovary* free, depressed or compressed; styles 2–3. *Utricle* membranous, included in the perianth. *Seed* horizontal or vertical, testa crustaceous, albumen floury; embryo annular.—Species about 50, all climates.

* *Scentless or fœtid herbs. Sepals* 5, *herbaceous* (not succulent in fruit). *Embryo perfectly annular.*

1. **C. album,** *Linn. Sp. Pl.* 219; erect or ascending, mealy or green, leaves rhombic deltoid or lanceolate acute or obtuse, entire toothed or irregularly lobulate, upper narrower more entire, sepals keeled covering the utricle, seed smooth keeled. *Moq. in DC. Prodr.* xiii. 2. 70; *Boiss. Fl. Orient.* iv. 901; *Wall. Cat.* 6952 (*excl.* most of C. (= *Amarantus viridis*). C. giganteum, *Don Prodr.* 74; *Moq. l. c.* C. nepalense, *Hort. Monsp.* C. album, *Linn.* C. viride, *Linn.*, and C. laciniatum, *Linn.*; *Roxb. Fl. Ind.* ii. 58, 59. C. purpurascens, *Ham., in Wall. Cat.* 6955. ? C. vulpinum, *Wall. Cat.* 6954 A.

TROPICAL and TEMPERATE HIMALAYA; from Kashmir to Sikkim, ascending to 12,000 ft. (wild and cultivated), and in WESTERN TIBET to 14,000 ft. Plains of BENGAL, the GANGETIC VALLEY and the PANJAB, KHASIA MTS., cult. DECCAN PENINSULA.—DISTRIB. Ubiquitous.

Stem 1–10 ft., rarely slender or decumbent, angled, often striped green, red or purple. *Leaves* extremely variable, in the cult. forms 4–6 in. long, with the petiole sometimes as long or longer. *Clusters* in compact or lax panicled spikes, which in cult. forms become thyrsoid. *Seeds* rarely vertical.—The cultivated forms vary from green to red.

2. **C. opulifolium,** *Schrad. in DC. Fl. Franc.* v. 372; erect or ascending, mealy, leaves broadly rhombic obtuse or acute sinuate-lobed upper similar, cymes axillary lax-fld. usually shorter than the leaves, sepals keeled partially covering the utricle, seed punctulate margin rounded. *Moq. in DC. Prodr.* xiii. 2. 67; *Boiss. Fl. Orient.* iv. 901.

CENTRAL and WESTERN HIMALAYA; Nepal, *Wallich*; Garwhal ?, *Edgeworth*; Kashmir and Lahore, alt. 6–8000 ft., *Clarke.* WESTERN TIBET, alt. 10–14,000 ft., *Thomson.*—DISTRIB. Europe, N. and W. Asia.

Very near *C. album,* and not easily distinguished in the small acute-leaved form except by the seed. In the ordinary state with broad openly sinuate obtuse leaves it is distinct enough.

3. **C. hybridum,** *Linn. Sp. Pl.* 219; erect, nearly glabrous, leaves large broadly triangular ovate long acuminate with 2–4 broad acute lobes

on each side, clusters in lax axillary and terminal almost leafless corymbose panicles, sepals obtusely keeled spreading in fruit, seed horizontal large opaque pitted hardly keeled. *Boiss. Fl. Orient.* iv. 902; *Moq. in DC. Prodr.* xiii. 2. 68; *Fl. Dan.* t. 2049.

WESTERN TIBET; Ladak, alt. 12,000 ft., *Thomson.* PESHAWUR; *Stewart.*—DISTRIB. Europe, N. Africa, N. Asia, N. America (introduced).

Stout or slender, with spreading branches, 1–3 ft. high, odour heavy. *Leaves* 3–5 in., almost shining, broadly ovate, pale green, thin, 3–5-nerved from near the usually cordate base. *Clusters* larger or small.

4. **C. murale,** *Linn. Sp. Pl.* 219; nearly glabrous, leaves bright-green rhombic or deltoid-ovate acute sides lobed and sharply toothed base cuneate, clusters in lax or dense axillary divaricate cymes, sepals obtusely keeled incurved in fruit, seed horizontal dotted acutely keeled opaque. *Boiss. Fl. Orient.* iv. 902; *Moq. in DC. Prodr.* xiii. 2. 69; *Fl. Dan.* t. 2048. C. Gandhium, *Ham.* (& Chamrium, *Ham.*), *Wall. Cat.* 6953. C. Hookerianum, *Moq. in DC. Prodr.* xii. 2. 68.

UPPER GANGETIC VALLEY and the PANJAB; *Royle,* &c. KUMAON and NEPAL; *Hamilton,* &c. DECCAN PENINSULA; at Bangalore, Coimbatore and elsewhere. CEYLON; at Trincomalee, *Glenie.*—DISTRIB. Ubiquitous.

Rather fœtid. *Stem* 6–14 in., stout or slender, erect or ascending; branches decumbent. *Leaves* ½–3 in. broad, rather shining; petiole long or short. *Spikes* sometimes very slender.

5. **C. glaucum,** *Linn. Sp. Pl.* 220; branches decumbent or prostrate, leaves oblong or ovate-oblong sinuate-lobed or -toothed very mealy beneath, clusters in short dense axillary spikes, sepals keeled nearly covering the utricle. *Boiss. Fl. Orient.* iv. 338; *Moq. in DC. Prodr.* xiii. 2. 72.

WESTERN TIBET; Ladak, alt. 12–14,000 ft., *Thomson.*—DISTRIB. Europe, N. and W. Asia, N. America, S. Chili, Australasia.

Much and widely branched, often succulent; stem 6–18 in., shining. *Leaves* ½–1 in., tip obtuse or rounded, base cuneate. *Spikes* ¼–1 in., simple or compound; lateral flowers usually 2–4-merous, with a vertical very small seed; terminal 5-merous, with a larger often horizontal seed.

** *Strongly aromatic glandular herbs. Embryo incompletely annular.*

6. **C. Botrys,** *Linn. Sp. Pl.* 219; erect, glandular-pubescent, branches and cymes spreading and recurved, lower leaves petioled ovate or oblong deeply sinuate or lobulate upper oblanceolate more entire, cymes short axillary and in long terminal racemes, sepals glandular-pubescent enclosing the utricle, seed horizontal subglobose smooth margin obtuse. *Moq. in DC. Prodr.* xiii. 2. 75; *Boiss. Fl. Orient.* iv. 903; *Sibth. Fl. Græc.* t. 253. C. ilicifolium, *Griff. Notul.* iv. 337, and *Ic. Pl. Asiat.* t. 521. C. nepalense, *Hort. Monsp.* Ambrosia Botrys, *Moq. Chenop. Enum.* 37: *Dalz. & Gibs. Bomb. Fl. Suppl.* 73.

TEMPERATE HIMALAYA; from Kashmir to Sikkim, alt. 4–10,000 ft. PESHAWUR; *Stewart.* WESTERN TIBET, alt. 11–14,000 ft.; a weed in fields.—DISTRIB. Europe, N. and W. Asia, N. Africa, introduced into America.

Very aromatic. *Stem* grooved and ribbed, 6–18 in. high, stout or slender. *Leaves* 1–3 in., usually oak-like, very obtuse; petiole variable. *Cymes* short, branched, flowers solitary or clustered, minute.

7. **C. ambrosioides,** *Linn. Sp. Pl.* 219; erect, puberulous and glandular, branches strict, leaves shortly petioled oblong or lanceolate obtuse

sinuate-toothed upper entire, clusters in slender axillary and terminal simple or panicled spikes, sepals enclosing the utricle, seed horizontal smooth shining, margin obtuse. *Wall. Cat.* t. 6956; *Moq. in DC. Prodr.* xiii. 2. 72; *Boiss. Fl. Orient.* iv. 904; *Wight Ic.* t. 1786; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. C. vulpinum, *Wall. Cat.* 6954 B.

BENGAL, SILHET and the DECCAN; *Wallich, Heyne,* &c.—DISTRIB. Widely spread in the Old World, introduced into America.

Usually a tall rank aromatic much-branched plant, easily distinguished by the long slender spikes of small clusters. Wight remarks that the flowers are polygamous at Coimbatore.

*** *Scentless herbs. Sepals 1–3, succulent, baccate in fruit. Embryo imperfectly annular.*

8. C. **Blitum**, *Hook. f. in Gen. Plant.* 52; glabrous, erect or ascending, leaves petioled triangular hastate or deltoid and cordate acuminate deeply acutely unequally toothed, clusters sessile axillary and in terminal leafy spikes, perianth baccate not enclosing the utricle, seed vertical smooth margin obtuse. Blitum virgatum, *Linn. Sp. Pl.* 4; *Boiss. Fl. Orient.* iv. 905; *Moq. in DC. Prodr.* xiii. 2. 83; *Lamk. Ill.* t. 5; *Bot. Mag.* t. 276.

N.W. INDIA; Kashmir, alt. 8500 ft. WESTERN TIBET, alt. 12–14,000 ft., *Thomson,* &c.—DISTRIB. Europe, N. and W. Asia, N. Africa.

Stem 1–3 ft., rather stout, white. *Leaves* 1–3 in., bright green; petiole slender, shorter or longer than the blade. *Clusters* ¼–⅓ in. diam. *Stamen* 1. *Seed* opaque.

3. BETA, *Linn.*

Succulent herbs. *Leaves* alternate, subentire. *Flowers* 2-sexual, solitary or in axillary spiked or cymose clusters. *Perianth* urceolate, 5-lobed, cohering in fruit by their enlarged hardened bases. *Stamens* 5. *Disk* fleshy, annular. *Ovary* depressed, sunk in the disk; style short, stigmas 2–4 subulate. *Utricle* adnate to the disk and base of perianth. *Seed* horizontal, testa thin, albumen floury; embryo annular.—Species 2 (or 6–8), N. Asiatic and European.

B. vulgaris, *Linn. Sp. Pl.* 222; annual or perennial, glabrous, root-leaves ovate or oblong obtuse base cuneate or cordate cauline rhombic ovate oblong obovate or lanceolate, spikes slender panicled, flowers sessile solitary or 2–3-nate, bracts narrow acute, sepals oblong obtuse thickened at the base in fruit. *Moq. in DC. Prodr.* xiii. 2. 55; *Boiss. Fl. Orient.* iv. 898; *Lamk. Encycl.* t. 182; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. B. benghalensis, *Roxb. Fl. Ind.* ii. 59; *Wall. Cat.* 6948. B. orientalis, *Roth Nov. Sp.* 181.

Cultivated in various parts of INDIA.

Stem 1–3 ft., erect, furrowed. Lower *leaves* 1–10 in., often trowel-shaped, base decurrent on the petiole, margin waved, upper short incurved. *Spikes* 6–18 in. slender, clusters remote. *Sepals* with membranous margins.—*Beet.*

4. SPINACIA, *Linn.*

Annual herbs. *Leaves* attenuate. *Flowers* diœcious, ebracteate, males in terminal leafless spikes; females in axillary clusters. MALE fl. *Sepals* 4–5, herbaceous, simple. *Stamens* 4–5, filaments capillary. FEM. fl.

Perianth subglobose, 2–4-toothed; fruiting enclosing the utricle, coriaceous, unarmed or with 2–3 dorsal spines. *Stigmas* long, filiform, connate below. *Utricle* hard, compressed, adnate to the perianth. *Seed* vertical, testa thin, albumen floury; embryo annular.—Species 4, Oriental, 2 of them extensively cultivated.

S. oleracea, *Linn. Sp. Pl.* 1027; erect, leaves deltoid ovate acuminate acutely broadly pinnatifidly lobed, fruiting perianths free 2-spinous. *Moq. in DC. Prodr.* xiii. 2. 118; *Lamk. Encycl.* t. 814; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Suppl.* 23. S. tetrandra, *Roxb. Fl. Ind.* iii. 771; *Wight Ic.* t. 818; *Wall. Cat.* 6949.

Cultivated throughout INDIA.—Native country unknown.

The *S. tetrandra* of Roxburgh is not the plant of Stevens, as M. de Candolle assumes it to be ("Origine des Plantes Cultivée," 79), but the common *S. oleracea*, which, as Boissier points out, is distinguished from *S. tetrandra* by the free fruiting perianths. Nevertheless De Candolle's suggestion that the cultivated *S. oleracea* is a derivative from the *S. tetrandra*, Stev., which is indigenous in the Caucasus, is a very reasonable one.—*Spinach.*

3. ATRIPLEX, *Linn.*

Herbs or shrubs, usually mealy. *Leaves* rarely opposite. *Flowers* monœ- or diœcious. MALE fl. ebracteate. *Sepals* 3–5, oblong, obtuse. *Stamens* 3–5. FEM. fl. 2-bracteate; bracts flat, accrescent, dilated in fruit and forming a 2-valved covering to the utricle. *Perianth* 0. *Utricle* at the base of the greatly enlarged and hardened bracts; stigmas 2. *Seed* erect, or inverse and suspended from the funicle, rarely horizontal, testa various, albumen floury; embryo annular.—Species about 100, all temperate, cool and tropical regions.

* *Flowers polygamous. Seed of the female fl. vertical, of the bisexual horizontal.*

1. **A. hortensis,** *Linn. Sp. Pl.* 1053; annual, stout, erect, leaves not mealy triangular-cordate upper ovate-lanceolate, spikes axillary and in terminal panicles, fruiting bracts nearly free thin orbicular or elliptic reticulate obtuse or mucronate. *Moq. in DC. Prodr.* xiii. 2. 91; *Boiss. Fl. Orient.* iv. 907; *Grah. Cat. Bomb. Pl.* 171; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. A. virgata, *Roth Nov. Sp.* 377; *Moq. l. c.* 97. A. bengalensis, *Lamk. Dict.* i. 276. A. heterantha, *Wight Ic.* t. 1787.

Cultivated in many parts of BENGAL, the DECCAN, N.W. INDIA and up to 12,000 ft. in the WESTERN HIMALAYA and TIBET.—DISTRIB. Cultivated in Europe and N. and W. Asia.

This, the Arroche, Orache or Mountain Spinach of the French, is of unknown origin, being found only under cultivation or in cultivated ground.—A specimen of this from Heyne, in Rottler's Herbarium, bears the name *A. virgata*, thus identifying that obscure plant, which Roth described from very young individuals.

** *Annuals, with monœcious flowers.*

2. **A. crassifolia,** *C. A. Mey. in Ledeb. Fl. Alt.* iv. 309; green and hoary, erect or ascending and diffuse, branches white, leaves petioled oblong or ovate-oblong or hastately ovate obtuse entire or sinuate-toothed upper entire often acute, male clusters in slender leafless interrupted spikes, fruiting bracts rhombic-ovate or orbicular herbaceous entire or toothed with a very thick white convex smooth disk and base. *Moq. in DC. Prodr.* xiii.

2. 93; *Boiss. Fl. Orient.* iv. 909; *Ledeb. Ic. Fl. Alt.* t. 42. A. laciniata, *Aitchison Cat. Panjab Pl.* 125, and *Herb. Ind. Or. H.f. & T.*

N.W. INDIA and the PANJAB; from the Jumna westward. KUNAWUR and WESTERN TIBET, alt. 8–12,000 ft., *Falconer, Thomson.*—DISTRIB. Affghanistan, Turkestan, Soongaria, Altai Mts.

Branched from the root; branches firm, 1–2 ft. *Leaves* usually small, 1–1½ in., pale; petiole slender. *Fruiting-bracts* very variable, from ovate with a cuneate base to orbicular, ⅛–⅓ in. long.—I fear that this is only a dry country form of *A. laciniata*, L., with white stems, small leaves, and hardened disk of the bracts, which Boissier describes as smooth or tubercled (they are quite smooth in the Indian plant). The name seems a singularly inappropriate one.

3. **A. rosea**, *Linn.* ? *Sp. Pl. Ed.* 2, 1493; green, mealy, branches very many diffuse slender ascending, leaves small petioled rhombic-ovate with obtuse sides and tips entire or subsinuate, male clusters in short axillary spikes, fruiting bracts small broadly triangular-hastate or flabelliform crenate thin disk coarsely reticulate or rugose. *Schkuhr Handb.* t. 350; *Fl. Dan.* 1284; *Boiss. Fl. Orient.* iv. 911. ? A. tartarica β virgata, *Boiss l. c.* 910.

WESTERN TIBET; banks of Salt Lakes, alt. 12–14,000 ft., in Sassar, Hanle, &c., *Thomson.*—DISTRIB. (of *A. rosea*) Westward to the Atlantic.

A very slender plant; branches 4–6 in., greenish-white. *Leaves* ¼–½ in., base cuneate. *Bracts* about ¼ in. broad or long, sometimes sinuate-lobed, subsessile or contracted into a hardened pedicel.—An obscure plant.

*** *Perennials; with monœcious flowers.*

4. **A. repens**, *Roth Nov. Sp.* 377; shrubby, white, stem woody prostrate rooting, leaves small petioled oblong elliptic or suborbicular obtuse, male clusters in short branched spikes, fruiting bracts united into a thick corky obovate or orbicular turgid pouch with thin free tips contracted at the base into a stout cylindric pedicel, disk smooth or rugose. *Moq. in DC. Prodr.* xiii. 2. 99. A. Kœnigii, *Wall. Cat.* 6951. A. cristata, *Kœnig mss.* A. Belangeri, *Boiss. Fl. Orient.* iv. 913. Obione Belangeri, *Moq. l. c.* 108. O. nummularia, *Moq. Enum. Chenopod.* 72. O. Kœnigii, *Moq. l. c.* 109; *Wight Ic.* t. 1790.

DECCAN PENINSULA, *Kœnig*; Tuticoreen in Tinnevelly, *Wight.* CEYLON, *Thwaites.*—DISTRIB. ? Affghanistan, Persia.

Branches woody, 1–2 ft. long, straggling or tufted and short. *Leaves* ¼–1 in. long, thick, tip rounded or retuse, base cuneate; petiole very short. *Fruiting-bracts* very variable, ¼–⅓ in. long or broad, sometimes compressed, smooth, at others almost globose with thick processes on the surface, lips very short crenate. *Radicle* pointing upwards.—The Affghan plant has smaller bracts, but of the same corky character, and with thick cylindric pedicels.

5. **A. Stocksii**, *Boiss. Diagn. Ser.* iv. 73; shrubby, white, branches woody prostrate or suberect, leaves small petioled oblong elliptic or suborbicular obtuse, male clusters axillary or in short leafy spikes, fruiting bracts cuneate at the base only orbicular or broadly ovate and suddenly contracted into a short pedicel disk small, lips broad quite entire thin reticulate. A. Griffithii, *var.* Stocksii, *Boiss. Fl. Orient.* iv. 916. A. repens, *Aitchison Cat. Pl. Panjab* 125. Obione Stocksii, *Wight Ic.* t. 1789; *Dalz. & Gibs. Bomb. Fl.* 212.

SCINDE; salt marshes at Kurrachee, *Stocks, Vicary.* GUZERAT; common, *Dalz. & Gibs.*

Habit and foliage very much like *A. repens*, but leaves often larger and fruiting-bracts very different.—Boissier has made this a variety of *A. Griffithii*, which appears to me to differ in its much larger orbicular sinuate thin leaves, and rhombic fruiting-bracts, which are corky throughout, united to the middle, and perfectly smooth. This is Moquin's type of *Griffithii*, so named by himself. Another plant of Griffith also numbered 1751 has very large orbicular fruiting-bracts nearly ⅔ in. diam., with a woody veined disk, the thin margins united all round (like an *Alyssum* fruit).' As for Moquin's description, it agrees with neither of these plants, and it is difficult to account for this, and for his suggestion that *A. Griffithii* may be a var. of the Australian *A. Lindleyi.*

6. **EUROTIA**, *Adans.*

Herbs or undershrubs, woolly or tomentose. *Leaves* small, alternate, entire. *Flowers* minute, 1-sexual. MALE fl. spicate, ebracteate. *Sepals* 4, obovate, obtuse. *Stamens* 4, filaments filiform. FEM. fl. axillary, 2-bracteate; bracts conduplicate, connate with free lips, at length closing over the utricle, becoming coriaceous, veined, villous, 2-beaked, and at length splitting into 4 valves. *Perianth* 0. *Utricle* ellipsoid, compressed, membranous; stigmas 2, filiform. *Seed* sessile, free, obovoid, beaked below, testa membranous, albumen floury; embryo horseshoe-shaped.

E. ceratoides, *C. A. Meyer in Led. Fl. Alt.* iv. 239; shrubby, hoary with stellate hairs, leaves linear-oblong or lanceolate obtuse floral narrower, fruiting bracts urceolate silkily villous with long reddish hairs. *Boiss. Fl. Orient.* iv. 917; *Moq. in DC. Prodr.* xiii. 2. 120. Axyris ceratoides, *Linn. Sp. Pl.* Achyranthes papposa, *Jacq. Ic. Rar.* t. 189. A. Moorcroftiana, *Brown in Wall. Cat.* 6950; *Moq. l. c.* 117.

WESTERN HIMALAYA; in the drier regions from Kunawur westward, and in WESTERN TIBET, alt. 8–14,000 ft., *Moorcroft*, &c.—DISTRIB. Central Europe from Spain eastward, Affghanistan, Central Asia, Siberia, Mongolia, N.W. America.

A bush; 2–4 ft. high, stunted and dwarf at high and dry elevations; branches strict, slender, leafy, glabrous or tomentose. *Leaves* ⅓–1½ in., rarely ovate or elliptic, margin often recurved; petiole very short; upper sessile. *Fruiting-bracts* crowded along the upper parts of the branches conspicuous for their long silky red-brown hairs ⅓ in. long.

7. **AXYRIS**, *Linn.*

Annual, stellately hairy or glabrate herbs. *Leaves* small, alternate, entire. *Flowers* minute, monœcious, ebracteate. MALE fl. in terminal clusters with 3–5 hyaline sepals, often irregularly placed, and 2–5 slender stamens. FEM. fl. axillary, solitary or mixed with the males. *Sepals* 3–4, unequal, at length scarious. *Utricle* membranous, embraced by the sepals, obovoid, compressed or spherical, tip shortly winged crested or 2-auricled, stigmas capillary very long. *Seed* erect, obovoid, adhering to the utricle, testa membranous marked with concentric lines, albumen granular; embryo horseshoe-shaped.—Species 5 or 6, N. and Central Asia, N.W. America.

A. amaranthoides, *Linn. Sp. Pl.* 979; erect, branched from the base, leaves ovate or oblong obtuse or acute. *Moq. in DC. Prodr.* xiii. 2. 116; *Lamk. Encycl.* t. 753; *Schkuhr Handb.* 285^b. A. hybrida, *Linn.*; *Moq. l. c.*; *Schkuhr l. c.*

WESTERN HIMALAYA; in the drier regions from Lahul to Kumaon, alt. 8–13,000 ft., and in WESTERN TIBET, alt. 10–14,000 ft., *Jacquemont, Strachey & Winterbottom, Thomson,* &c.—DISTRIB. Turkestan, Soongaria, the Altai, Siberia, N. China.

Very variable in size, 4–10 in. high; stem stout or slender. *Leaves* ⅓–1½ in., pale-yellowish or reddish-brown when dry; nerves faint; petiole short, slender. *A. hybrida* is, I think, only the longer branched state of *A. amaranthoides*.

Var. *humifusa*, Moq. l. c.; very small, procumbent.—Western Tibet, *Thomson*, *Clarke*. Topedunga (with *Microgynæcium*), *Strachey & Winterbottom*.—I suspect that the *A. prostrata* does not differ from this.

There is a fragment of an *Axyris* gathered in Lahul by the Rev. H. Jaeschke, and described as a garden weed, which has ovate obtuse leaves 1 in. long, on petioles of the same length.

8. **MICROGYNÆCIUM**, *Hook. f.*, *Gen. Plant.* iii. 56.

A small diffuse prostrate puberulous or glabrous annual. *Leaves* alternate, petioled, ovate, entire. *Flowers* monœcious, very minute, clustered, hidden amongst the leaves. MALE fl. ebracteate. *Perianth* hyaline, 5-lobed. *Stamens* 1–4, filaments very long. FEM. fl. 2-bracteate, solitary or crowded, bracts unchanged in fruit. *Perianth* 0. *Utricle* hyaline, obliquely ovoid, turgid, compressed, covered with scattered processes, and 1–2-auricled at the top; stigmas capillary. *Seed* erect, testa coriaceous, albumen granular; embryo horseshoe-shaped.

M. tibeticum, *Hook. f. l. c.*

WESTERN TIBET; Topedunga, north of Kumaon, *Strachey & Winterbottom*. SIKKIM; at Tungu, alt. 12–14,000 ft., *J. D. H.*

Stem branched from the base, branches 1–2 in., slender. *Leaves* ¼–¾ in., green, rather fleshy, nerves indistinct; petiole half as long. *Flowers* microscopic.—A very inconspicuous plant.

9. **CORISPERMUM**, *Linn.*

Annual stiff herbs. *Leaves* alternate, rigid, 1-nerved, narrow, floral margined with white, hiding the short spikes. *Flowers* 2-sexual, ebracteolate. *Sepals* 1–3, unequal, scarious. *Stamens* 1–5, unequal. *Utricle* exserted, orbicular or oblong, compressed, hardened, margined or winged; stigmas subulate, recurved. *Seed* erect, adherent to the pericarp, testa coriaceous, albumen floury; embryo annular.—Species 8, S. Europe, N. and W. Asia, China, N.W. America.

C. hyssopifolium, *Linn.*; *Boiss. Fl. Orient.* iv. 930; glabrous or softly hairy, diffusely branched from the base, leaves linear or narrowly linear-obovate obtuse, spikes axillary and terminal dense or lax, bracts linear oblong green or margin white. *Moq. in DC. Prodr.* xiii. 2. 140; *Sibth. Fl. Græc.* t. 1.

WESTERN TIBET; alt. 10–15,000 ft., *Falconer*, *Thomson*.—DISTRIB. S. France, Caucasus, Soongaria to China.

Branches 6–10 in., rigid, stout or slender. *Leaves* ½–1½ in., thick, green, usually obtuse and apiculate. *Spikes* 3–6 in., continuous with the branches; bracts laxly or closely imbricate, ⅙–¼ in. long, oblong-lanceolate, acute, coriaceous. *Utricle* oblong, shining, winged all round.

10. **CHENOLEA**, *Thunb.*

Tomentose, silky or villous herbs or shrubs. *Leaves* alternate, narrow, entire. *Flowers* minute, axillary, 2-sexual and female, immersed in wool, ebracteate. *Perianth* with 5 incurved lobes, at length closing over the utricle, with the lobes usually tubercled or spinous at the back. *Stamens* 5. *Utricle* membranous, included in the crustaceous or coriaceous perianth; stigmas 2–3, capillary. *Seed* orbicular, horizontal, testa thin, albumen scanty; embryo annular.—Species 20, S. Europe, N. Africa, Temp. Asia, Australia, with one N. American and one S. African.

1. **C. divaricata,** *Hook. f.*; annual, erect, excessively branched from the base and upwards, softly rufous villous, leaves linear obtuse, fruiting perianth with 5 acute dorsal straight spines about as long as the diameter of the disk. Echinopsilon divaricatus, *Kar. & Kiril. in Bull. Soc. Hist. Nat. Mosq.* 736. E. tibeticus, *Herb. Ind. Or. H. f. & Thoms.*

WESTERN TIBET; alt. 11–14,000 ft., *Thomson*, &c.—DISTRIB. Soongaria, W. China.

Whole plant clothed with long soft spreading hairs. *Stem* 4–15 in., stout, straight in well-developed specimens, sometimes as thick as a goose-quill, very leafy, striped green and white; branches innumerable, forming a pyramidal mass. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in. long, soft, mottled green and white (when freed of hairs). *Clusters* of flowers axillary. *Perianth* minute; sepals short, villous. *Stamens* as long as the sepals. *Utricle* depressed; styles 2, filiform.

2. **C. ? sedoides,** *Hook. f.*; annual, tall, slender, erect, hoary-tomentose or glabrate, branches ascending very slender, leaves fleshy semiterete green some filiform others oblong and minute glabrous or the upper villous, clusters 2–3-fld. in long slender spikes shorter than the floral leaves, perianth villous, fruiting with conical spines equalling the diameter of the disk or shorter often unequal. Kochia sedoides, *Schrad. Neue. Journ.* 1809, 86; *Boiss. Fl. Orient.* iv. 926. Echinopsilon sedoides, *Moq. in Ann. Sc. Nat. Ser.* 2. 127, and in *DC. Prodr.* xiii. 2. 136. Salsola sedoides, *Pall. Voy.* 280, t. 41, f. 2. S. cinerea, *Waldst. & Kit. Pl. Hung.* ii. 110, t. 106. Suæda sedifolia, *Pall. Illust.* t. 32, 33, 34.

SCINDE, *Stocks.*—DISTRIB. Siberia, Soongaria, Caucasus to Bulgaria.

The specimens are flowerless, but seem to belong to this species. *Stem* white. *Leaves* $\frac{1}{10}$–$\frac{1}{4}$ in., often gibbous at the base below, then at the tips of the branches longer and villous with tawny hairs, but for which the plant might be taken for a *Suæda.*

11. **KOCHIA,** *Roth.*

Villous or pubescent rarely glabrous undershrubs or herbs. *Leaves* alternate, sessile, narrow, entire. *Flowers* minute, 2-sexual and female, axillary, ebracteate. *Perianth* subglobose, lobes 5 incurved, fruiting closing over the utricle coriaceous girt by 5 free or confluent horizontal wings. *Stamens* 5; anthers large, exserted. *Utricle* depressed, membranous; style slender, stigmas 2–3 capillary. *Seed* orbicular, horizontal, testa membranous, albumen scanty; embryo annular.—Species 20, S. Europe, Temp. Asia, N. and S. Africa, Australia, N.W. America.

* *Perennials.*

1. **K. prostrata,** *Schrad. Neue. Journ.* 1809, 85; a villously pubescent low undershrub with a very stout woody rootstock; branches slender erect or spreading, leaves flat linear subacute, clusters in long leafy spikes, wings of fruiting perianth subquadrate hard and scarious strongly nerved crenate about equalling the diameter of the disk. *Boiss. Fl. Orient.* iv. 923; *Moq. in DC. Prodr.* xiii. 2. 132. Salsola prostrata, *Linn.*; *Jacq. Fl. Austr.* t. 294. Chenopodium Augustanum, *All. Fl. Pedem.* ii. 198, t. 38, f. 4.

WESTERN HIMALAYA; in the dry regions of Kunawur and Zanskar; and in WESTERN TIBET, alt. 10–14,000 ft., *Thomson*, &c.—DISTRIB. Westwards to Spain and N. Africa, Siberia, Central Asia.

Rootstock as thick as the thumb; branches very numerous, 6–10 in., as well as the leaves and flowers densely fulvous-villous. *Leaves* ⅓–½ in., nerveless. *Spikes* slender. *Fruiting-calyx* ⅛–⅙ in. diam., margins of adjacent wings approximate.

** *Annuals (always ?).*

2. **K. odontoptera,** *Schrenk in Bull. Acad. Petersb.* i. 361 (1843); annual, diffusely branched from the base, densely tomentose, leaves small short flat linear acute, clusters in long or short simple or branched leafy spikes, wings of fruiting perianth cuneate or flabellate scarious strongly nerved crenate-lobed about equalling the diameter of the disk. *Boiss. Fl. Orient.* iv. 924. K. stellaris, *Belang. Voy. Or. Io. ined.* K. odontoptera & K. stellaris, *Moq. Enum. Chenopod.* 93, and in *DC. Prodr.* xiii. 132. Panderia pilosa, *Herb. Ind. Or. H.f. & T. in part.*

WESTERN TIBET, alt. 8–12,000 ft., *Thomson.*—DISTRIB. Affghanistan, Turkestan, Persia.

Root sometimes as thick as the finger and possibly perennial; branches long or short, slender; pubescence closer and paler than in *K. prostrata*; leaves much shorter, ⅙–¼ in. long; wings of fruiting perianth narrower, contracted at the base, the margins of adjacent ones distant.—I follow Boissier in identifying this with Schrenk's *K. odontoptera.*

3. **K. scoparia,** *Schrad. Neue. Journ.* 1809, 85; annual, glabrous or pubescent, strict, erect, leaves green linear-lanceolate acute, clusters in leafy panicled spikes, wings of the fruiting perianth short semicircular scarious nerved entire shorter than the diameter of the disk. *Boiss. Fl. Orient.* iv. 925; *Moq. in DC. Prodr.* xiii. 2. 130. Chenopodium scoparia, *Linn.*

NORTH-WEST INDIA, *Royle, Jacquemont.*—DISTRIB. N. and Central Asia to Japan and westward to Spain.

A tall herb, 3–5 ft.; branches erect and stem white smooth, usually glabrous, the ultimate twigs pilose or villous. *Leaves* 1–1½ in., midrib distinct. *Fruiting-perianth* described as being very variable.—The characters given above apply to the only Indian specimen I have seen; it is Royle's, and without particular locality; others have the wings reduced to a short acute tubercle, or are quite simple.

4. **K. indica,** *Wight Ic.* t. 1791; annual? softly villous, diffusely branched from the base, branchlets divaricate long, leaves small elliptic or linear-oblong acute, wings of fruiting perianth short broadly triangular-ovate obtuse thick nerveless much shorter than the diameter of the disk. K. Griffithii, *Bunge in Boiss. Fl. Orient.* xiii. 2. 924. Panderia pilosa, *Herb. Ind. Or. H. f. & T. in part.*

NORTH-WEST INDIA, from Delhi to the Indus, common. DECCAN PENINSULA salt soils at Coimbatore, *Wight.*—DISTRIB. Affghanistan.

Branches of this closely resemble long ones of *K. prostrata* in hairiness, &c., but the habit is much more straggling, the plant is apparently annual, and the wings of the fruiting perianth are very different. Wight states that the flowers are sometimes male only, and I think it probable that fertile males are on different plants from the female or hermaphrodite. Boissier observed that Wight's plant is the same as *Griffithii*, but was unaware that Wight had published it. The Panjab plant distributed under "Herb. Ind. Or. H. f. & T." as *K. scoparia*, is, I think, rather referable to *K. indica.*

XII. ARTHROCNEMUM, *Moq.*

Fleshy leafless jointed shrubs or herbs. *Flowers* minute, 2-sexual, 2–3 together in the axils of the scales of sessile cone-like spikes, 2-bracteate.

Perianth obpyramidal, 3–4-gonous. *Stamen* 1. *Utricle* compressed, membranous; stigmas 2–3. *Seed* inverse, compressed, testa membranous, albumen fleshy; embryo dorsal, comma-shaped, radicle stout inferior.—Species 7 or 8, of temperate and tropical saline places.

1. **A. indicum,** *Moq. Chenopod. Enum.* 113, and in *DC. Prodr.* xiii. 2. 151; stem prostrate woody, branches short diffuse ascending, joints ¼–⅓ in. diam., spikes cylindric broader than the joints, floral joints very short hardly 2-lipped concealing the flowers. *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 282; *Dalz. & Gibs. Bomb. Fl.* 212. Salicornia indica, *Willd. in Nov. Act. Hist. Nat.* ii. 3, *ex Vahl Enum.* i. 10; *Wight Ic.* t. 737; *Roxb. Fl. Ind.* 185, and *Ed. Carey & Wall.* i. 84; *Grah. Cat. Bomb. Pl.* 171.

BENGAL; in salt marshes, *Roxburgh.* NORTHERN CIRCARS, *Wight.* BOMBAY, *Graham,* &c.—DISTRIB. Trop. Africa.

Stems several feet long, branches opposite and alternate, 1–3 in. high; joints ⅙–⅓ in. long, mouth slightly dilated. *Spikes* ½–1 in. long, joints ⅛ in. deep, cup-shaped, closely imbricate, fruiting very spongy with thin margins. *Fruiting-perianths* 3 together, shorter than the cup-shaped joints, closely appressed, laterally compressed, spongy, gibbous towards the axis of the spike, flat towards the cup; top broadly truncate with a minute hole for the protrusion of the stigmas. *Stamens* not seen. *Utricle* adnate to the perianth, ovoid, compressed, indurated. *Seed* free, erect, orbicular, testa membranous; embryo and albumen of the genus.

2. **A. ?glaucum,** *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 283; shrubby, densely branched, joints 1/10–⅛ in diam., spikes hardly stouter than the branches, floral joints not closely imbricating, fruit exposed. *Boiss. Fl. Orient.* iv. 932. A fruticosum, *var.* glaucum, *Moq. in DC. Prodr.* xiii. 2. 151.

DECCAN PENINSULA, *Herb. Wight* (*Kew Distrib.* No. 2474, 2475). CEYLON, *Thwaites.*—DISTRIB. Mediterranean, W. Asia, Trop. Africa.

Apparently tall, stem below as thick as the little finger; branches many, erect or ascending, slender. *Male flowers* (in threes, consisting of 3 stamens each in a membranous perianth ?). *Female spikes* about as long as broad, obscurely 2-lipped. *Utricle* flagon-shaped, enclosed in the broadly ovoid spongy perianth, which has a minute hole for the protrusion of the stigmas. *Seeds* orbicular, testa black thinly crustaceous; embryo and albumen of the genus.—I am not quite sure as to the structure, &c., of the male flowers (No. 2474), and am doubtful as to its distinctness from *A. fruticosum.* It is, I think, monœcious.

XIII. SALICORNIA, *Linn.*

Herbs or shrubs with the habit of *Arthrocnemum,* but with the flowers sunk in cavities of the joints. *Perianth* obpyramidal, 3–4-toothed, fruiting spongy. *Stamens* 1–2. *Utricle* included in the spongy perianth, membranous; stigmas subulate. *Seed* erect, compressed, testa hispid with hooked hairs, albumen 0; embryo conduplicate, radicle inferior parallel to the folds of the cotyledons.—Species 8, temperate and tropical.

S. brachiata, *Roxb. Fl. Ind.* i. 84, and *Ed. Wall. & Carey,* i. 82; perennial erect with diffuse opposite rather slender branches, joints stout shortly bifid, lobes rounded, spikes slender cylindric. *Wall. Cat.* 6941; *Wight Ic.* t. 738; *Moq. in DC. Prodr.* xiii. 2. 145; *Ung. Sternb. in Atti Bot. Congr. Firenz.* 1874, 304. Arthrocnemum indicum, *Thwaites Enum.* 246.

BENGAL; in salt marshes, *Roxburgh.* TANJORE, *Wight.* CEYLON, north of the island, *Thwaites.*

Stem woody, 12-18 in., thick at the base, much branched; branches about ⅛-¼ in. diam.; lobes of joints with (when dry) membranous margins. *Flowers* 3-nate. *Stamen* 1. *Utricle* ovoid, subacute, styles distinct. *Testa* thinly coriaceous; embryo hooked, both ends pointing downwards.—Moquin erroneously cites Nepal as a habitat, and suggests its not being distinct from *S. herbacea*, which it does not resemble. Roxburgh describes the perianths as flask-like, fleshy, with a longitudinal slit for the exsertion of stamens and styles, and as adhering together firmly and to the joints till the seed is ripe.

XIV. **SUÆDA**, *Forsk.*

Herbs or shrubs. *Leaves* fleshy, terete, rarely flattish. *Flowers* minute, axillary, usually 2-sexual, bracteate and 2-bracteolate. *Perianth* short, 5-lobed or -partite; lobes or segments equal or unequal, simple or gibbous or subwinged. *Stamens* 5, short. *Utricle* included, membranous or spongy; stigmas 2-5, minute, subulate, recurved. *Seed* erect, oblique or horizontal, testa crustaceous or coriaceous, albumen scanty or 0; embryo plano-spiral. —Species about 40, in saline shores and deserts.

Many annual species have dimorphic flowers; viz. summer ones with albuminous seeds and crustaceous testa, and autumnal ones with larger almost exalbuminous seeds and a membranous testa. I am far from sure that I have correctly determined the names and synonymy of the Indian species.

* *Perennials. Styles usually 3-5, rarely 2.*

1. **S. fruticosa**, *Forsk. Fl. Æg. Arab.* 70; suberect or decumbent, branches erect or divaricate, leaves ½-terete linear or ellipsoid obtuse floral very short, spikes slender leafy, flowers axillary solitary or 2-3-nate, 2-sexual, fruiting perianth subglobose segments obtuse incurved, styles 3 short, seed vertical or horizontal, testa black shining. *Boiss. Fl. Orient.* iv. 939; *Moq. in DC. Prodr.* xiii. 2. Salsola fruticosa, *Linn.*; *Grah. Cat. Bomb. Pl.* 17; *Engl. Bot.* t. 635; *Cav. Ic.* t. 285; *Sibth. Fl. Græc.* t. 255. S. indica, *Wall. Cat.* 6946 C. S. Lana, *Edgew. in Hook. Journ. Bot.* ii. (1840) 286; *Moq. l. c.* 190.

NORTH-WEST INDIA; from Delhi, and throughout the Panjab, westward to the Indus, common in the plains.—DISTRIB. Westward to the Atlantic, Africa and America.

Stem and branches usually slender. *Leaves* very variable, ⅛-¼ in. long.—I have seen no specimen of Edgeworth's *Salsola Lana*, which I assume from his description and locality to be *S. fruticosa*. Bunge, according to Boissier (Fl. Or. iv. 950, under *Haloxylon recurvum*) refers it to *Schoberia indica*.

2. **S. monoica**, *Forsk. Fl. Æg. Arab.* 70; shrubby, branches suberect, leaves linear flattish obtuse, spikes leafy panicled, flowers axillary 2-3-nate polygamous, bracts minute scarious entire, fruiting perianth obovate-oblong lobes obtuse incurved, styles 2-5 short, seed vertical, testa black shining. *Boiss. Fl. Orient.* iv. 940; *Moq. in DC. Prodr.* xiii. 2. 156; *Wight Ic.* t. 1792. S. nudiflora, *Thwaites Enum.* 246.

SOUTH DECCAN; on the sea coast at TINNEVELLY, and Tuticorin, *Wight.* CEYLON, *Moon*, &c.—DISTRIB. Arabia, Trop. Africa.

I am in great doubt about this Indian plant, which in a dry state is difficult to distinguish from *S. fruticosa* and *vermiculata.* Boissier, l. c. 940, says that Thwaites' *S. indica* is *S. monoica*, but Thwaites quotes *Wight Ic.* t. 1796, which has densely crowded flowers (not 2-3 together as Boissier describes). Boissier (under *S. fruticosa*) further says that all the specimens he has seen of *S. indica*, Willd., are referable to *S. fruticosa* or *monoica*. The plant I have here called *monoica* is Wight's t. 1792;

it has a longer fruiting-perianth than *S. fruticosa*, which is very shortly lobed, and the bracts are smaller and more entire; it is also more erect.

3. **S. nudiflora,** *Moq. in Ann. Sc. Nat. Ser.* xxiii. 316, and in *DC. Prodr.* xiii. 2. 155; stem woody diffusely branched, leaves semiterete obtuse ellipsoid or the lower linear or obovate-oblong, bracts hyaline toothed often forming persistent stellate tufts, flowers crowded in dense globose clusters forming leafless spikes polygamous, fruiting perianth obovoid lobes short, styles 3, seed erect, testa crustaceous black. *Dalz. & Gibs. Bomb. Fl.* 213. S. indica, *Moq. l. c.*; *Wight Ic.* t. 1796; *Thwaites Enum.* 246; *Dalz. & Gibs. l. c.*; *Wall. Cat.* 6946 A. Salsola nudiflora, *Willd. Sp. Pl.* ii. 1313; *Roxb. Fl. Ind.* ii. 60; *Grah. Cat. Bomb. Pl.* 270. S. fruticosa? *Wall. Cat.* 6944. S. elata, *Wight in Wall. Cat. l. c.* Chenopodium prostratum, *Roxb. mss.*

On the sea coast; BENGAL, BOMBAY, the DECCAN and CEYLON.

I retain this species with much hesitation, suspecting that it is a form of *S. monoica*, Forsk., or *S. vermiculata*, Forsk. It is evidently a common coast plant; and there is a good figure of it in Roxburgh's Icones, with the mss. name of *Chenopodium prostratum*, by which it is by inadvertence alluded to (under *S. indica*) in Roxburgh's Flora (ii. 62). The stellate tuft of toothed bracts left at the axils of leaves after the fruiting perianths have fallen away, is often a very marked character, as are the leafless spikes of confluent globose many-fld. clusters.

** *Annuals. Styles* 2.

4. **S. maritima,** *Dumort. Fl. Belg.* 22; erect, glaucous green, glabrous, branched usually from the base, leaves linear or filiform semiterete floral very small, clusters of flowers minute in very slender spikes, fruiting perianth depressed lobes rounded covering the utricle, styles long slender, seed usually horizontal. *Boiss. Fl. Orient.* iv. 941; *Trimen in Journ. Bot.* xxiii. (1885) 173. S. nudiflora, *Moq. in DC. Prodr.* xiii. 2. 155. Chenopodium maritimum, *Linn.*; *Engl. Bot.* t. 633; *Fl. Dan.* t. 489. Schoberia maritima, *C. A. Mey. in Ledeb. Fl. Alt.* i. 400. Chenopodina maritima, *Moq. l. c.* 161. C. indica, *Wight l. c.* t. 1793. Salsola salsa, *Jacq. Hort. Vind.* iii. 44, t. 83. S. indica, *Willd. Sp. Pl.* i. 1317, *ex Roxb. Fl. Ind.* ii. 62; *Wall. Cat.* 6946 F; *Grah. Cat. Bomb. Pl.* 170. S. nudiflora, *Wall. Cat.* 6945. S. sativa, *Wight in Wall. Cat. l. c.*

UPPER GANGETIC PLAINS; Delhi, *Clarke*. Sea coast of BENGAL, BOMBAY, the DECCAN and CEYLON.—DISTRIB. Siam, Europe, N. Africa, N. and W. Asia, N. America.

This appears to be the European plant, though apparently sometimes becoming woody, if not shrubby. Roxburgh indeed describes it as a perennial, but his figure is that of an annual. Graham states that it is universally eaten and an essential article of food during famines. Wallich's (not Willdenou's) *Salsola nudiflora* is a common state with the floral leaves shorter than the clusters. Trimen (l. c.) describes as an erect variety of *S. maritima*, a plant with slender ascending branches and very short leafy bracts, which is found in salt pans in Ceylon with *S. nudiflora & indica*, adding that it is not the *S. indica* of Wight Ic. t. 1793. I have no material for ascertaining what it is.

5. **S. corniculata,** *Hook. f. in Gen. Pl.* iii. 67; slender, small, diffusely branched from the base, leaves ¼–½ in. oblong or linear-oblong obtuse floral ovate, flowers very minute 2–3-nate axillary unisexual?, perianth turbinate fleshy lobes gibbous behind or two produced into rounded vertical wings, utricle orbicular membranous adherent to the perianth, seed vertical or horizontal not or hardly beaked some subglobose with thinly coriaceous pale testa, others lenticular with black crustaceous testa. Schoberia corniculata,

C. A. Mey. in Ledeb. Fl. Alt. i. 399, and *Ic. Fl. Ross.* t. 195; *Moq. in DC. Prodr.* xiii. 2. 166.

WESTERN TIBET; Parang Valley and Hanle Plains, alt. 14–15,000 ft., *Thomson.*—DISTRIB. Soongaria, Siberia.

Glaucous; branches 4–8 in., spreading and ascending, white. *Leaves* scattered or crowded, pale when dry. *Bracts* microscopic, jagged. *Flowers* extremely minute; perianth fleshy but thin.—The black seeds occur indiscriminately amongst the pale.

6. **S. microsperma,** *Ledeb. Fl. Ross.* iii. 785; diffusely branched from the base, leaves $\frac{1}{8}$–$\frac{1}{3}$ in. linear-oblong obtuse flattish floral oblong, flowers very minute 2–5-nate axillary 2-sexual, perianth subglobose lobes equal rounded obscurely tubercled in fruit, utricle orbicular membranous adherent to the perianth, seed vertical or horizontal orbicular with a long beak, testa thinly coriaceous pale. *Boiss. Fl. Orient.* iv. 943. Schoberia microsperma, *C. A. Mey. in Eichw. Pl. Casp. Cauc.* 14, t. 13. Chenopodina prostrata & parviflora, *Moq. in DC. Prodr.* xiii. 2. 163, 165. C. pygmæa, *Moq.? Herb. Ind. Or. H. f. & T.*

WESTERN TIBET; banks of the Indus, and of Lake Thogji Chumo, alt. 13–15,500 ft., *Thomson*; Lake Pangong, *H. Strachey.*—DISTRIB. Siberia, Lake Aral, Soongaria.

This appears to me to be very near *S. corniculata*, having the same structure and minute size of perianth seed, &c., but the perianth is globose without the gibbosities of that plant, and the seed has the radicular end produced into a long beak. *S. microsperma* is described as having a black shining testa, which I do not find in either the Tibetan or Soongarian specimens, and it is reasonable to suppose that the seeds are dimorphic in this as in *S. corniculata.*

15. HALOXYLON, *Bunge.*

Shrubs or small trees with opposite jointed branches. *Leaves* opposite, triangular and very short, or longer and terete. *Flowers* small solitary or spicate, axillary, 2-sexual, 2-bracteolate. *Sepals* 5, concave, accrescent and horizontally winged. *Stamens* 5 or fewer, on the margin or base of a cupular disk with alternating rounded or square staminodes. *Utricle* globose or depressed, enclosed in the perianth; stigma 2-lobed or stigmas 3–4 recurved. *Seed* horizontal, testa membranous, albumen 0; embryo plano-spiral.—Species 8–10, S. Europe, W. and Central Asia, Indian.

This genus might be united to *Anabasis*, differing only in the position of the seed.

Leaves distinct.

1. **H. recurvum,** *Bunge in Boiss. Fl. Orient.* iv. 949; tall, glabrous, pruinose, dark brown, paniculately branched, branches divaricate, leaves $\frac{1}{6}$–$\frac{1}{3}$ in. trigonous or semiterete ovate-subulate or ellipsoid obtuse or acute, floral about equalling the axillary flowers, stigma obtuse or obscurely 2-lobed, fruiting sepals with large erect ovate obtuse lips and orbicular erose scarious wings. H. recurvum & H. Stocksii, *Hook. f. in Gen. Pl.* iii. 70. Caroxylon recurvum, *Moq. in DC. Prodr.* xiii. 2. 175. C. indicum, *Wight Ic.* t. 1794. Salsola Stocksii, *Boiss. Diagn. Ser.* 2. iv. 75. S. Lana, *Stocks mss.* S. recurva, *Wall. Cat.* 6943.

The WESTERN PANJAB PLAINS and SALT RANGE, ascending to 2500 ft., *Edgeworth, Stewart.* SCINDE, *Stocks.* SOUTH DECCAN PENINSULA; Coimbatore, *Wight.* BURMA; banks of the Irawaddi, *Wallich.*—DISTRIB. Affghanistan, Yunan.

A straggling bush, blackish when dry, several feet high with long spreading strict or recurved branches a foot long or less, ending in strict spikes 2–6 in. long; joints of stem ½–¾ in. apart, of spikes ¼ in. or less. *Sepals* obtuse; fruiting perianth ¼ in. diam. *Style* elongate. *Staminodes* rounded.—The Scinde specimens have more fleshy and obtuse leaves; most of the Coimbatore and all the Panjab ones are very robust with strict branches; the Burmese ones and one of the Coimbatore are much more slender with recurved branches. In the "Genera Plantarum" I proposed the name *S. Stocksii* for the Scinde specimens, regarding them as distinct from the Burmese by their much stouter habit and thicker obtuse leaves, but more copious specimens from all the localities have convinced me that all are forms of one variable plant. Boissier gives Beluchistan as the locality for Stocks's specimens, but those in the Kew and Wight's Herbaria are from Scinde.

2. **H. Thomsoni,** *Bunge in Boiss. Fl. Orient.* iv. 950; a dwarf hoary pale puberulous much-branched shrub, leaves ¼–½ in. linear terete obtuse floral shorter and small rounded bracteoles villous in the axils, flowers often densely crowded, fruiting sepals with very short rounded tips and orbicular or subreniform scarious entire wings, stigmas 2 linear-oblong. H. Griffithii ?, *Herb. Ind. Or. H. f. & T.* (*not of Boissier*).

WESTERN TIBET; alt. 10–14,000 ft., *Falconer, Thomson:* Shigar Valley, alt. 7–8000 ft., *Clarke, Bellew.*

Rootstock short, stout, woody, sending up many branches 4–10 in. high; branches woody below, rather slender, glaucous; branchlets divaricate, rather slender, joints 1 in. or less. *Flowers* 2–3-nate or in globose clusters which are broader than the floral leaves. *Perianth* 1/10 in. long in flower, in fruit ¼ in., wings brown. *Ovary* laxly woolly.—Very near *C. Griffithii*, but the leaves are always developed, and there are only 2 stigmas.

Var. *gracillima*; 12–18 in. high, extremely slender, paniculately branched, flowers more distant subsolitary.—Iskardo, alt. 8000 ft., *Clarke.* In flower only.—Habit much more slender, but the flowers are identical.

** *Leaves reduced to the dilated tips of the joints.*

3. **H. salicornicum,** *Bunge in Boiss. Fl. Orient.* iv. 949; a low erect strict pale almost leafless shrub, joints produced into two very short triangular points woolly within, spikes long erect, bracteoles ovate axils woolly, fruiting sepals with very short obtuse tips and flabelliform scarious white crenate wings, stigmas subclavate. Caroxylon salicornicum, *Moq. in DC. Prodr.* xiii. 2. 174.

SCINDE; *Stocks* (*in Herb. Dalzell*).—DISTRIB. Beluchistan, Affghanistan.

Stem woody, 1–2 ft. high; branches erect or ascending, terete; joints of stem ½ in., of branches about ¼ in., of spikes shorter. *Fruiting-perianth* about ¼ in. diam., tips of sepals with membranous margins, wings often irregularly developed.—Possibly the specimen in Dalzell's Herbarium is from Beluchistan, though marked Scinde; it is in flower only.

4. **H. multiflorum,** *Bunge in Boiss. Fl. Orient.* ix. 949; a low erect pale much-branched almost leafless shrub, joints produced into two very short rounded tips, spikes short, bracteoles orbicular concave, sepals very short obtuse, fruiting sepals with very short obtuse tips and orbicular cordate or flabellate scarious wings, stigmas lanceolate. Anabasis multiflora, *Moq. in DC. Prodr.* xiii. 2. 212.

NORTH-WESTERN PANJAB PLAINS, and the SALT RANGE, ascending to 2000 ft., *Stewart.*—DISTRIB. Affghanistan.

Closely allied to *H. salicornicum*, but much lower, 4–6 in. high, with a very stout woody stem and almost fascicled branches; the leaves and bracteoles are much broader, not woolly, the spikes shorter, and fruiting perianth larger, ⅓ in. diam.

16. **SALSOLA,** *Linn.*

Herbs or shrubs; branches not jointed. *Leaves* usually alternate, sessile, often short and pungent. *Flowers* small, solitary or fascicled, axillary, 2-sexual, 2-bracteolate. *Sepals* 4–5, concave, fruiting accrescent usually horizontally and broadly winged above the middle, completely embracing the utricle. *Stamens* 5 or fewer, usually hypogynous. *Utricle* ovoid or orbicular, fleshy or membranous; stigmas 2–3, subulate or linear. *Seed* usually horizontal, testa membranous, albumen 0; embryo spiral.—Species 40, Europe, N. and S. Africa, Temp. Asia, Australia, N. America.

Annual spinescent herbs. Leaves ovate-subulate or linear.

1. **S. Kali,** *Linn.*; *Boiss. Fl. Orient.* iv. 954; pubescent, scabrid or glabrous, diffusely branched from the base, branches stout rigid, leaves short subulate-lanceolate from a ½-amplexicaul base thick rigid pungent, flowers 1–3 together axillary or subspicate, bracts and sepals subequal pungent, fruiting perianth cartilaginous base rounded, wings obovate orbicular or reniform scarious sometimes obsolete. *Moq. in DC. Prodr.* xiii. 2. 187. ? S. Jacquemontii, *Moq. l. c.* 188.

NORTH-WESTERN PANJAB; Peshawur, *Stewart.* WESTERN TIBET, alt. 12–14,000 ft., *Thomson,* &c.—DISTRIB. Westward to the Atlantic, N. Asia, N. and S. Africa, Australia, N. America.

Usually glaucous; stem 6–18 in. rarely erect, and branches soft and pithy within, striped green and white. *Leaves* ⅓–1½ in., spreading and recurved. *Fruiting-perianth* ¼–⅓ in. diam., transparent, often rose-coloured. *Seed* adherent to the utricle.

2. **L. collina,** *C. A. Mey. in Led. Fl. Alt.* i. 393; erect or decumbent, simple or branched, protean in habit and foliage, glabrous or hispid, leaves ovate rigid or broadly subulate or linear and flaccid tip pungent base ½-amplexicaul, floral similar much longer than the bracts, flowers 1–3 axillary, perianth membranous, sepals lanceolate equal or unequal, fruiting dimorphic, either little changed and adnate below to and enclosed within the hardened and thickened bases of the floral leaf, bracts and bracteoles, or with the the bracts, &c., unchanged and the sepals becoming broadly equally or unequally winged. *Moq. in DC. Prodr.* xiii. 2. 188; *Pall: Ill. Pl.* 34, t. 26; *Ledeb. Fl. Ross.* iii. 800.

KUNAWUR, *Herb. Royle.* WESTERN TIBET, alt. 12–15,000 ft., common, *Thomson, Clarke.*—DISTRIB. S. Russia, Siberia; Soongaria.

A most puzzling plant, usually smaller in all its parts than *L. Kali,* so variable in habit that it is difficult to believe that the various Tibetan forms are referable to one species. The originally described form, well figured by Pallas, has diffuse stiff branches uniformly clothed throughout with imbricating ovate-lanceolate appressed coriaceous green leaves ¼–⅓ in. long, with white margins and 1–2 flowers in the axils of each, with ovate erect pungent bract and bracteole; its exact counterpart occurs in Tibet. The greatest contrast to this is a strict erect simple or branched form, with scattered distant spreading cylindric or filiform flaccid leaves an inch long, and axillary flowers sunk in the hardened nut-like connate bases of the leaf bracts and bracteoles. Another form is 6–14 in. high, erect, with green striped stout stem and branches, and rigid spreading or recurved or flexuous spinescent linear or lanceolate leaves ¼–½ in. long. Another has stout branches spreading on the ground, with filiform leaves 1½ in. long. Another form has dense squarrose tufts of branches beset closely with rigid subulate recurved imbricating leaves ⅙–¼ in. long. The perianth is as variable as the habit and foliage: when the perianth becomes winged, it is rarely regularly so; when the bases of the bracts, &c., become indurated round the flower, the sepals rarely become winged; their indurated bases vary from 1/8–1/4 in. long, are pale and smooth, rounded and often gibbous, or bigibbous below; they are very thick and woody; they occur on the same plant with the normal fruiting-bracts. Ledebour notices a similar condition of *S. Kali* as lusus *nodiflora* (Fl. Ross. iii. 799). He regards *collina* as a species between *S. Kali* & *tamariscinum*, differing from *Kali* in the bracts being never rigidly spinescent, and the fruiting perianth being always membranous below, and from both in the minute perianth wings: these distinctions altogether break down in Tibetan and other examples of *S. collina*.

** *Unarmed shrubs. Leaves minute subglobose.*

3. **S. fœtida,** *Del. Fl. Ægypt.* 57; a stout hoary pale excessively branched shrub with stout stem and filiform crowded branchlets clothed with uniformly minute subglobose fleshy leaves, floral leaves imbricate rather longer, forming short spikes, bracteoles like the leaves, fruiting perianth minute (1/10 in. diam.) silvery-white, wings symmetrical rounded margins often overlapping, stigmas 2 recurved. *Boiss. Fl. Orient.* iv. 961. S. Moorcroftiana, *Wall. Cat.* 6947 (and misspelt S. Marosteum by *Moq. in DC. Prodr.* xiii. 2. 191). S. indica, *Herb. Royle.* S. spinescens, *Wight Ic.* t. 1795. Caroxylon fœtidum, *Moq. in l. c.* 178.

PANJAB PLAINS, UPPER GANGETIC PLAIN, from Delhi, *Moorcroft*, westwards, *Royle*, *Edgeworth*, &c. SCINDE, *Stocks*.—DISTRIB. Beluchistan, Persia, Arabia, N. Africa.

A large shrub, stinking of rotten fish (in Egypt, not hitherto observed in India), forming dense masses of filiform twigs and minute leaves, amongst which the little perianths shine like silver stars.—The branchlets often bear globose villous galls, 1/4–1/3 in. diam., beset with linear leaves, and caused by insect-puncture.

4. **S. verrucosa,** *M. Bieb. in Mem. Soc. Hist. Nat. Mosq.* i. 141; a stout hoary shrub or tree with the habit and leaves of *S. fœtida*, but flowers in dense clusters and spikes, and fruiting perianth 1/4–1/3 in. diam. dark brown. *Boiss. Fl. Orient.* iv. 961; *Moq. in DC. Prodr.* xiii. 2. 180. S. dendroides, *Pall. Ill. Pl.* t. 14 (*with the leaves too thick, according to Boiss.*). S. georgica, *Bunge in Ledeb. Fl. Ross.* iii. 814.

NORTH-WESTERN PANJAB; lower hills and the Peshawur Valley, *Stewart*. DISTRIB. Siberia, Persia, Armenia, the Caucasus, S. Russia.

Boissier says that this differs from *S. fœtida* in the lower leaves being filiform, 1–1½ lines long, and the others he describes as "½-terete filiform slender;" but this does not at all agree with any of the numerous specimens in Herb. Kew, except one of a var. *glabrescens* (Caucasus, *Hohenacker*). Some specimens have smaller and white fruiting-perianth, approaching those of *S. fœtida*.—This plant is (like *S. fœtida*) infested with galls.

17. ANABASIS, *Linn.*

Perennial herbs or shrubs, branches jointed. *Leaves* opposite, fleshy or obsolete. *Flowers* small, solitary or clustered, axillary, 2-sexual, female minutely 2-bracteolate. *Sepals* 5, scarious, fruiting winged or not. *Stamens* 5, on a short disk, alternating with 5 staminodes. *Utricle* included or exserted, subglobose, dorsally compressed, dry or fleshy; style short, stigmas 2 subulate. *Seed* erect, orbicular, compressed, testa membranous or coriaceous, albumen 0; embryo spiral.—Species 15, S. Europe, N. Africa, W. and Central Asia.

1. **A. phyllophora,** *Kar. & Kir. in Bull. Soc. Nat. Mosq.* 1840; a dwarf glabrous pale leafless shrub, stems many erect from a woody stock, joints long terminating in two triangular acute teeth (leaves); flowers soli-

tary in opposite axils spicate, staminodes ciliolate, fruiting perianth with 3 conniving wings the posterior largest. *Boiss. Fl. Orient.* iv. 970 (*from which the above character is taken*).

The PANJAB; by the Jhelum River, *Aitchison*.—DISTRIB. Soongaria, Turkestan, Altai.

The only specimen is not in flower; but it precisely accords with the Soongarian plant. I have refrained from quoting the synonyms that Boissier (on Bunge's authority) gives, because I suspect some confusion to exist. *Anabasis intermedia*, Moq. and *A. subulifolia*, Schrenk, must, according to the characters attributed to them, differ much from this. Nor do I see why this, all the specimens of which are as leafless as a *Salicornia*, should be called *phyllophora*.—Boissier gives Damascus as the locality for his plant, and speaks doubtfully of its identity with the Soongarian.

2. **A. setifera**, *Moq. in Chenop. Enum.* 164, and in *DC. Prodr.* xiii. 2. 214; a dwarf leafless glaucous pale shrub, stem rough when dry, leaves short oblong thick fleshy semiterete obtuse with a deciduous bristle, axils woolly, flowers crowded in the upper axils, floral leaf oblong or rounded, bracts minute linear membranous ciliate, staminodes subquadrate, fruiting perianth ½ in. diam., wings 3–5 obovate or orbicular-cordate hyaline not nerved, stigma obscurely 2-lobed. *Boiss. Fl. Orient.* iv. 970.

The PANJAB; on the Salt Range, *Stewart*.—DISTRIB. Persia, Arabia, Egypt.

The solitary specimen precisely accords with the *A. subulifolia*, Schrenk, of Haussknecht's Iter Orientale from Persia, which differs altogether from Schrenk's character of that species and from *A. phyllophora*, with which Boissier unites *subulifolia*. It agrees with the characters of *A. setifera* in everything but having only 3 winged sepals instead of 5, and, as I find 3 and 4 in some of Bunge's specimens gathered and named by himself, this character is evidently of no value.

18. HALOCHARIS, *Moq.*

Hispidulous annuals, branches often whorled. *Leaves* alternate, sessile, fleshy, tipped with rigid hairs. *Flowers* axillary, solitary, 2-sexual, 2-bracteolate. *Sepals* 5, lanceolate, hyaline. *Stamens* 5, on a fleshy disk; anthers linear, cells narrow parallel separate, connective inflated; staminodes 0. *Utricle* included, ovoid or orbicular, compressed, membranous, rugulose; stigmas 2, slender. *Seed* suspended, inverse, lenticular, laterally compressed, testa membranous, albumen 0; embryo plano-spiral.—Species 5, Persia, Affghanistan and Central Asia.

1. **H. violacea**, *Bunge Anabas. Revis.* 63, t. 1, f. 3; a small sparsely hispid prostrate diffusely branched annual, hairs very long, leaves linear subtriquetrous obtuse floral oblong equalling or exceeding the bracteoles, spikes subcapitate, perianth squarrosely hispid with very long hairs, connective produced into an obovoid violet appendage longer and broader than the anther-cells. *Boiss. Fl. Orient.* iv. 975.

WESTERN PANJAB PLAINS, the SALT RANGE, alt. 2000 ft., and PESHAWUR VALLEY, common, *Stewart*.—DISTRIB. Affghanistan, Beluchistan, S.E. Persia.

Branched from the base; branches slender, 3–6 in., tips ascending. *Leaves* scattered, ¼–½ in. *Flowers* minute, concealed by the long bristles.

2. ? **H. sulphurea**, *Moq. in DC. Prodr.* xiii. 2. 201, *in part*; erect, hispid with long bristles, leaves linear subtrigonous obtuse floral oblong about equalling the lanceolate hirsute bracteoles, flowers in capitate clusters which are spicate on terminal short branches, outer sepals villous, connective produced into a sessile elongate ellipsoid yellow appendage

much longer and broader than the anther-cells. *Bunge Anabas. Revis.* 63, t. 1, f. 2; *Boiss. Fl. Orient.* iv. 975. Halimocnemis sulphurea, *Moq. Chenop. Enum.* 152.

The PANJAB; west of the Indus, *T. W. H. Tolbert.*—DISTRIB. Assyria, Persia.

A much larger and stouter plant than *H. violacea*, with capitate clusters of leaves and flowers ⅓ in. diam., forming long interrupted spikes. I have seen but one specimen, which differs from the only authentic one I have seen of *H. sulphurea* in the larger more globose heads, and longer appendage of the anthers.

19. **HALOGETON,** *C. A. Meyer.*

Annuals. *Leaves* alternate, sessile, fleshy, obtuse or tipped with a long bristle. *Flowers* minute, axillary, clustered, polygamous, immersed in wool, 2-bracteolate. *Sepals* 5, 2 outermost winged or gibbous, hyaline. *Stamens* 5 or fewer, filaments linear, anthers simple; staminodes 0 or 5, lingulate. *Utricle* included, ovoid, membranous; stigmas 2, filiform. *Seed* usually inverse, laterally compressed, rostellate, testa membranous or subcoriaceous, albumen 0; embryo spiral.—Species 5, Spain, N. Africa, West and Central Asia.

This genus would perhaps be better united with *Salsola*. There are in Falconer's and Thomson's Tibetan collections flowerless specimens of what is probably another species, with more or less woolly stems, leaves cylindric ½–⅔ in. long, terminated by a very long stout pale-brown bristle.

H. glomeratus, *C. A. Mey. in Ledeb. Fl. Alt.* i. 378, and *Ic. Ross.* t. 40; a much-branched soft glaucous or hoary erect or ascending leafy green herb, leaves minute cylindrical ellipsoid or obovate often tipped with a fugacious bristle axils glabrous or woolly, floral and bracteoles similar, flowers very minute solitary or clustered, sepals 4–5 hyaline lanceolate fruiting with long claws and fan-shaped or orbicular white pink or brownish hyaline-veined wings. *Boiss. Fl. Orient.* iv. 985; *Moq. in DC. Prodr.* xiii. 2. 206. Anabasis glomerata, *M. Bieb. in Act. Mosq.* i. 110, and iv. 19. H. tibeticus, *Bunge mss.*

WESTERN TIBET; alt. 12–14,000 ft., abundant, *Falconer, Thomson,* &c.—DISTRIB. Siberia, Soongaria, Turkestan, Afghanistan.

Branched from the base; primary branches 2–10 in. long, white, as thick as a goose-quill or less. *Leaves* often in clusters (arrested branches) ⅙–¼ in. long, green, the larger with membranous basal auricles. *Fruiting-perianths* densely crowded, ¼–⅓ in. diam.—Bunge (in lett.) regards the Tibetan plant as different from the Soongarian, but I can find no character; both are very variable in the size of the leaves and of the fruiting perianth. Boissier describes the flowers as clustered, the outer in each cluster female, the rest 2-sexual and diandrous.

20. **BASELLA,** *Linn.*

A much-branched twining fleshy herb. *Leaves* alternate, broad, entire. *Flowers* spicate, sessile, 2-sexual, white red or violet; bract minute, caducous; bracteoles 2, united into a 2-lipped cup and adnate to the perianth. *Perianth* fleshy, 5-fid, at length baccate, lobes short incurved. *Stamens* 5, on the mouth of the tube, filaments short, erect in bud; anthers versatile. *Utricle* globose, included, thin, adhering to the seed; stigmas 3, linear-clavate. *Seed* erect, subglobose, testa crustaceous, albumen scanty; embryo plano-spiral, cotyledons large thin involute.

B. rubra, *Linn.*; *Moq. in DC. Prodr.* xiii. 2. 223; *Lamk. Ill.*

t. 215, f. 1; *Gærtn. Carp.* t. 126. B. alba, *Linn.*; *Roxb. Fl. Ind.* ii. 104; *Wall. Cat.* 6960; *Wight Ic.* t. 896; *Grah. Cat. Bomb. Pl.* 170; *Dalz. & Gibs. Bomb. Fl. Suppl.* 73. B. canalifolia, *Ham.*; *Wall. Cat.* 6961. B. alba, *L.*, nigra, *Lour.*, cordifolia, *Lamk.*, ramosa, *Jacq.*, japonica, *Burm.*, and lucida, *L.*, *Moq. l. c.* 223, 224. B. ramosa, *Jacq. f. Eclog.* ii. 10, t. 161; *Reichb. Hort.* t. 61. B. crassifolia, *Wight mss.*—*Rheede Hort. Mal.* vii. t. 24.

Throughout INDIA, wild or cultivated, and in CEYLON.—DISTRIB. Trop. Asia and Africa.

Glabrous. *Leaves* petioled, broadly ovate or cordate or orbicular, 2–7 in. diam., narrowed into the petioles. *Spikes* 1–6 in., axillary, peduncled, simple or branched, flowers white or red. *Fruit* size of a pea, red white or black.—Roxburgh regards two varieties of this, a red- and a green-stemmed one, as wild in India, and adds three cultivated sorts, a red- and a white-stemmed that are raised from seed, and differ only in luxuriance from the corresponding wild forms; and lastly a large sort (*B. lucida*, L., and *cordifolia*, Lamk.), which is the most cultivated, and is always increased by slips; it is the largest form, covering trellises and native houses, and is the most succulent, and more used as a pot-herb than the others.

ORDER CXVIII. **PHYTOLACCACEÆ.**

Glabrous trees shrubs or herbs. *Leaves* alternate, quite entire; stipules small or 0. *Flowers* racemed, bracteate and 2-bracteolate. *Sepals* 4–5, imbricate in bud. *Petals* 0. *Stamens* 4, alternate with the petals, or more and irregularly inserted; filaments usually persistent and anthers deciduous. *Carpels* 1 or more, superior, free or connate, 1-ovuled; stigmas usually sessile and recurved; ovules amphitropous or campylotropous. *Ripe carpels* dry or fleshy. *Seeds* erect, often arillate; albumen fleshy or floury; embryo peripheric.—Genera 20, species about 60, tropical and temperate.

Rivina Latbenia, *Ham.* in *Wall. Cat.* 6952, from Patna, erroneously cited by Moquin under his *Pircunia Latbenia*, is the common South American *Rivina lævis*, L. (*R. orientalis*, Moq.), or an allied plant, no doubt cultivated at Patna. Mohlana nemoralis, *Mart.*, a Brazilian and African undershrub with reticulate fruit, is naturalized in several parts of Ceylon (Trimen in Lond. Journ. Bot. xxiii. (1885) 173.

PHYTOLACCA, *Linn.*

Shrubs or herbs, rarely trees. *Leaves* exstipulate. *Flowers* 1–2-sexual. *Sepals* 4, oblong, obtuse. *Stamens* 5–25. *Carpels* 5–10, free or connate, fleshy in fruit. *Seeds* reniform, compressed, exarillate, albumen floury; embryo annular, cotyledons slender, radicle ascending.—Species 10, tropical and subtropical.

P. acinosa, *Roxb. Fl. Ind.* ii. 458; quite glabrous or puberulous, leaves elliptic-ovate or lanceolate acuminate narrowed into the stout petiole, racemes shortly peduncled. *Wall. Cat.* 1598. P. decandra, *var.* β. acinosa, *Moq. in DC. Prodr.* xiii. 2. 33. P. Kæmpferi, *A. Gray in Mem. Amer. Acad.* N. S. vi. 404. Pircunia Latbenia, *Moq. l. c.* 29, *excl. syn. Wall. Cat.*

TEMPERATE HIMALAYA, wild or cultivated, from Hazara and Kashmir to Bhotan, alt. 5–9000 ft.—DISTRIB. China, Japan.

Stems 3–5 ft., stout, herbaceous, succulent. *Leaves* 6–10 by 2½–4 in., green, thinly succulent. *Racemes* 2–6 in., erect, many-fld., rachis stout; bracts linear-lanceolate, membranous; pedicels ¼ in. *Flowers* ⅓ in. diam. *Sepals* broadly oblong, obtuse. *Ripe carpels* about 10, nearly free, blue-black.—The Japanese specimens have broader leaves than the Himalayan. The leaves are eaten cooked.

ORDER CXIX. POLYGONACEÆ.

Herbs, rarely shrubs. *Leaves* rarely opposite, entire or serrulate; stipules (ochreæ) scarious or membranous, usually sheathing the stem. *Flowers* usually 2-sexual, jointed on the pedicel. *Perianth* of 3–6, free or connate, persistent sepals, imbricate in bud. *Stamens* 5–8, rarely more or fewer, opposite the sepals. *Disk* annular glandular or 0. *Ovary* free, 2–4-gonous; styles 1–3, stigmas various; ovule 1, basilar, orthotropous. *Nut* hard, usually enclosed in the calyx. *Seed* erect, testa membranous, albumen floury or horny; embryo various, radicle superior.—Genera 30, species about 600, chiefly temperate.

Polygonear. familiæ sedifolia, Wall. Cat. 6286, from the mountains of Nepal, is a remarkable plant, which being without flower or fruit I fail to refer to its genus, or even order. It is prostrate, hirsute, consisting of creeping interlaced stems and branches as thick as a sparrow's quill, the terminal ones bearing imbricate membranous short cup-shaped ochreæ with oblique entire ciliate mouths, and fleshy linear-oblong obtuse subsessile leaves ¼–½ in. long, and hirsute on both surfaces; filiform simple root fibres are given off from the stem, and these also are hirsutely fibrillose. A solitary rigid peduncle, ⅛–¼ in. long, terminates some of the branches, and this bears a small short cupular ochrea. The whole plant much resembles (superficially) a small creeping hirsute *Æschynanthus*.

Tribe 1. **Eupolygoneæ.** *Perianth* 3–5-cleft. *Stamens* 1–8, rarely more. *Stigmas* 2–3, capitellate, rarely fimbriate.

* *Shrubs.*

Stamens 12–18. Styles 4 . . . . 1. CALLIGONUM.
Stamens 8. Styles 3 . . . . 2. PTEROPYRUM.

** *Herbs or undershrubs.*

Stamens 8 or fewer. Cotyledons flat . . . . 3. POLYGONUM.
Stamens 8. Cotyledons plaited . . . . 4. FAGOPYRUM.

Tribe 2. **Rumiceæ.** *Perianth* 4–6-cleft. *Stamens* 9, rarely 6. *Stigmas* fimbriate, peltate or horseshoe-shaped.

Sepals 6, unchanged in fruit. Nut 3-winged . . . . 5. RHEUM.
Sepals 4, unchanged in fruit. Nut 2-winged . . . . 6. OXYRIA.
Sepals 6, 3 inner enlarged in fruit (except *R. acetosella*) . . . . 7. RUMEX.
See *Kœnigia* under *Polygonum*.

1. CALLIGONUM, *Linn.*

Rigid much-branched shrubs. *Leaves* alternate, linear subulate or obsolete, ochrea short. *Flowers* solitary or few, loosely clustered, ochreate, 2-sexual. *Sepals* 5, flat. *Stamens* 12–18. *Ovary* 4-angled. *Nut* exserted, 4-angled, angles variously crested winged echinate or setose. *Seed* oblong, terete or 4-angled; embryo central, straight, cotyledons narrow.—Species 20, in deserts of W. and Central Asia and Africa.

C. polygonoides, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 29. An almost leafless shrub or small tree with terete pale flexuous branches and very slender branchlets, leaves most minute bristles at the distant nodes, nuts oblong hard densely clothed with many series of branching intricate rigid red-brown flexuous bristles. *Boiss. Fl. Orient.* iv. 1000.

The PANJAB, *Edgeworth, Talbart*; Salt Range, alt. 2000 ft., *Stewart*. SCINDE, *Stocks*; Boogtee Hills, *Vicary*.—DISTRIB. Persia, Armenia, Syria.

Flowering branches about as thick as a crow-quill or less, internodes 1–1½ in. long; pedicels ⅛–⅙ in.; sepals about as long. *Fruit* ½–1 in. diam. including the shaggy branched bristles, nucleus about ¼ in.

2. **PTEROPYRUM,** *Jaub. & Spach.*

Rigid shrubs. *Leaves* small, alternate or fascicled, linear or spathulate; ochrea very short or obsolete. *Flowers* small, ochreate, 2-sexual. *Sepals* 5, subequal. *Stamens* 8. *Ovary* 3-angled, acuminate; styles 3. *Nut* broadly 3-winged, beaked. *Seed* beaked, base broad; embryo eccentric, cotyledons oblong, short.—Species 5–6, Western Asiatic.

P. Oliveri, *Jaub. & Spach. Ill. Plant. Orient.* ii. 9, t. 108; leaves fascicled thick glaucous obovate oblong spathulate or linear-oblong obtuse nerveless, nut broadly 6-winged in two superposed series of wings, the lower wings broadest. *Meissn. in DC. Prodr.* xiv. 1. 31; *Boiss. Fl. Orient.* iv. 1002; *Wight Ic.* t. 1809. P. Griffithii, *Meissn. l. c.* Atraphacis sp., *Aitchison Cat. Pl. Panjab.* 125.

SCINDE, *Vicary, Stocks*.—DISTRIB. Affghanistan, Persia.

An excessively branched shrub, branchlets white. *Leaves* ½–¾ in., margins often recurved. *Clusters* many-fld., sessile; flowers shortly pedicelled. *Fruit* ½ in. diam., nearly circular in outline; each angle of the nut with 2 superposed wings brought about by the 3-gonous nucleus twisting as the wings grow, the effect of which is that each vertical wing is as it were cut in two in the middle, and the upper half of the wing of one angle alternates with the lower half of the wing of another angle.

3. **POLYGONUM,** *Linn.*

Herbs, rarely undershrubs. *Leaves* alternate, entire, rarely lobed; stipules tubular, membranous, rarely minute and 2-fid. *Flowers* 2-sexual, small or minute, clustered; clusters axillary or terminal, bracteate and bracteolate, axillary and sessile, or in spiciform capitate or panicled racemes; pedicel short usually jointed under the perianth; bracts and bracteoles membranous, ochreate. *Disk* glandular or 0. *Perianth* 4–5- rarely 3-cleft, 2 outer sepals usually smallest. *Stamens* 5–8, rarely 1–4, perigynous. *Ovary* compressed or 3-gonous; styles 2 or 3, free or combined below, stigmas usually capitellate. *Nut* included in the more or less enlarged (rarely fleshy) perianth, trigonous or biconvex. *Seed* albuminous; embryo lateral, radicle long, cotyledons small (rarely large), flat, accumbent, rarely incumbent.—Species about 150, in all latitudes.

A very troublesome genus, the Indian species of which have been much confused, and I cannot hope that I have finally settled the limits of those especially of the *Persicaria* and *Avicularia* sections. *Kœnigia* is regarded as a section of *Polygonum*.

KEY TO THE SECTIONS.

A. *Stipules minute 2-partite.*

Sect. 1. KŒNIGIA. A minute annual. Flowers in terminal clusters. Stigmas subsessile. Nut subterete.—Sp. 1.

Sect. 2. ELEUTHEROSPERMA. Slender annuals. Flowers in terminal and axillary clusters. Styles minute free. Seed loose in the triquetrous nut.

B. *Stipules tubular elongate.*—Sp. 2–3.

Sect. 3. AVICULARIA. Herbs. Leaves small; stipules hyaline, cleft or torn. Flowers axillary. Styles minute free. Albumen horny.—Sp. 4–11.

Sect. 4. AMBLYGONON. Perennial-rooted herbs. Flowers in spiciform racemes; bracts tubular, truncate. Nut orbicular; *cotyledons incumbent.*—Sp. 12–14.

Sect. 5. TOVARA. A perennial-rooted tall herb. Leaves broad. Flowers distant in very slender racemes; bracts tubular. Nut flattened with 2 rigid persistent hooked styles.—Sp. 15.

Sect. 6. BISTORTA. Erect or prostrate annual or perennial-rooted herbs. Flowers in spiciform racemes; bracts hyaline, ovate or lanceolate not tubular.—Sp. 16–23.

Sect. 7. PERSICARIA. Erect or decumbent unarmed often glandular annuals or perennials. Leaves narrow. Flowers in slender or dense spiciform racemes; bracts tubular.—Sp. 24–38.

Sect. 8. CEPHALOPHILON. Erect or prostrate unarmed annuals rarely perennials or shrubs. Leaves broad, sometimes lobed or auricled. Flowers capitate; bracts not tubular.—Sp. 39–48.

Sect. 9. ECHINOCAULON. Erect or ascending usually prickly annuals. Leaves usually broad, often hastate. Flowers capitate or racemose, bracts tubular. (Hardly distinct from *Cephalophilon.*)—Sp. 49—55.

Sect. 10. ACONOGONON. Erect shrubs, rarely herbs. Flowers in branched panicles; bracts open or very shortly tubular.—Sp. 56–67.

Sect. 11. TINIARIA. Twining herbs. Leaves broad, hastate or cordate. Flowers in axillary clusters or slender racemes; bracts not tubular.—Sp. 68–70.

Sect. I. KŒNIGIA, *Hook. f.* A minute annual. *Leaves* often opposite; stipules short 2-lobed or -partite. *Flowers* in terminal and axillary clusters or heads; bracts not tubular or sheathing. *Perianth* 3–5-cleft. *Stamens* 1–5 without interposed glands. *Stigmas* 2–3, subsessile. *Nut* subterete or compressed; cotyledons accumbent.

1. **P. islandicum**, *Hook. f.*; glabrous, leaves obovate, flowers very minute. Kœnigia islandica, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 83; *Lamk. Ill.* t. 51; *Fl. Dan.* t. 418. K. monandra, *Dcne. in Jacq. Voy. Bot.* 142, t. 147; *Meissn. l. c.*

ALPINE WESTERN HIMALAYA; in marshy places from Kashmir to Kumaon, alt. 12,000 ft. WESTERN TIBET, alt. 11–14,000 ft.—DISTRIB. Arctic and subarctic regions and Altai Mts.

Stems very slender, succulent, forming tufts 1–6 in. high with matted roots. *Leaves* ⅛–¼ in., petioled, obtuse. *Flowers* 2-sexual or female. *Perianth-lobes* equal or unequal. *Stamen* usually solitary (rarely 2) in the Indian plant. *Nut* rather longer than the perianth.—Maximovicz (Mel. Biol. xi. 309) doubts the validity of *Kœnigia* as a genus.

Sect. II. ELEUTHEROSPERMA, *Hook. f.* Slender annuals. *Leaves* small, broad; stipules 2-partite. *Flowers* in axillary and terminal clusters. *Perianth* 5-cleft; bracts not tubular or sheathing. *Stamens* 2–4. *Styles* minute, free. *Seed* loose in the acutely triquetrous nut; cotyledons accumbent.

2. **P. delicatulum**, *Meissn. in DC. Prodr.* xiv. 1. 127; quite glabrous, stem filiform, leaves sessile or subsessile ⅛—¼ in. elliptic ovate or ovate-cordate acute, flowers minute in axillary clusters scarcely exceeding

the bracts, stamens 2–3, nut 3-quetrous usually much longer than the perianth. Kœnigia, *No.* 3 *&* 4 *Herb. Ind. Or. H. f. & T.*

ALPINE HIMALAYA; on wet rocks, alt. 10–16,000 ft., from Sikkim to Kashmir, *Wallich*, &c.

Annual, 4–12 in., tufted, flaccid. *Leaves* distant, nerves obscure; petiole rarely $\frac{1}{10}$ in.; stipular segments acute or obtuse, entire or crenate. *Perianth* very minute, $\frac{1}{20}$ in. long, segments obtuse or acute, 2 outer smaller. *Stamens* very short. *Nut* very variable in size, ovate-lanceolate, twice or thrice as long as the perianth, pale, coriaceous, angles very prominent, faces concave. *Seed* loose.

3. **P. filicaule,** *Wall. Cat.* 1694; sparingly strigose, stem very slender, leaves petioled $\frac{1}{3}$–$\frac{2}{3}$ in. ovate or ovate-lanceolate obtuse or acute, flowers in axillary and terminal sessile clusters pedicelled, stamens 3–4, nut trigonous slightly longer than the perianth. *Meissn. in Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 127; *Bab. in Trans. Linn. Soc.* xviii. 104; *Gærcke in Bot. Reis. Pr. Waldem.* 136. P. alpestre, *Wall. Cat.* 1725. P. microphyllum, *Klotzsch mss.* Kœnigia nepalensis, *Don Prodr.* 74. Kœnigia, *No.* 2 *Herb. Ind. Or. H. f. & T.*

SUBALPINE and ALPINE HIMALAYA; in woods, &c., alt. 9–16,000 ft., from Sikkim to Kashmir. WESTERN TIBET; Ladak, alt. 11–12,000 ft., *Stewart.*

Annual, 4–18 in., flaccid, tufted, rather succulent; stem with often a few reflexed hairs below the nodes. *Leaves* distant, rarely 1 in., soft, most strigose beneath; stipular lobes glabrous or hairy, acute or obtuse. *Perianth* $\frac{1}{20}$ in. long, white; segments rounded, 2 outer smaller. *Filaments* very short. *Nut* ellipsoid, pale, coriaceous, angles very prominent, faces concave. *Seed* loose.—Meissner and Babington describe 8 stamens. I find only 3–4. *P. alpestre*, *Wall.*, is the fully developed state; vars. *cæspitosum* and *extenuatum* of Meissner are more Alpine forms.

Sect. III. AVICULARIA, *Meissn.* Erect or prostrate herbs, rarely undershrubs. *Leaves* small; stipules tubular hyaline, cleft or torn. *Flowers* in axillary clusters; bracts tubular. *Perianth* 4–5-cleft. *Stamens* 3–8, very short. *Styles* 3, minute, free. *Nut* 3-gonous. *Albumen* horny, cotyledons incumbent.

* *Root perennial, branches herbaceous* (*shrubby in* 7. *P. salicornioides*). —*See also* P. plebejum.

4. **P. recumbens,** *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 116; puberulous or scaberulous, stems long stout woody much-branched grooved prostrate and ascending, leaves $\frac{1}{3}$–$\frac{2}{3}$ in. petioled broadly elliptic flat obtuse or acute nerves obscure, stipules ovate-lanceolate tumid with a strong excurrent nerve on each side, pedicels short jointed at the tip, fruiting perianth obvoid 5-partite. *Meissn. in DC. Prodr.* xiv. 1. 96.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 4500–8000 ft., *Royle*, &c.

Rootstock stout; branches many, 1–2 ft., as thick as a crow-quill and more, rooting at the base. *Leaves* close set; stipules $\frac{1}{6}$–$\frac{1}{2}$ in., lanceolate and acuminate or truncate and lacerate, nerves variable, longer than the pedicels. *Nuts* $\frac{1}{18}$ in., long, broadest below the middle, black, shining.

5. **P. cognatum,** *Meissn. Polyg. Prodr.* 91, and in *DC. Prodr.* xiv. 1. 96; glabrous or nearly so, stems short subsimple prostrate and ascending angled, leaves $\frac{1}{6}$–$\frac{1}{2}$ in. petioled elliptic obtuse or acute thick nerveless, stipules ovate tumid hyaline subentire nerves 2 short included, pedicels crowded short jointed at the tip, fruiting perianth very thick urceolate tube twice as long as the orbicular lobes. P. alpestre, *C. A. Meyer Enum. Pl. Cauc.* 157; *Boiss. Fl. Orient.* iv. 1037; *Jaub. & Sp. Ic. Pl. Orient.* t. 118.

P. rupestre, *Karel & Kiril. En. Plant. Alt.* 789. P. confertum, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 116; *Meissn. l. c.* P. ammannioides, *Jaub. & Sp. l. c.* t. 119. P. affine, *Stephan. mss.*; *Spreng. Syst.* ii. 256, *not of Don.*

WESTERN HIMALAYA; from Kashmir to Garwhal, alt. 11,000–14,500 ft., *Royle*, &c. WESTERN TIBET; ascending to 16,500 ft., *Thomson*, *Stewart*, &c.—DISTRIB. Soongaria, Persia, Syria, Asia Minor, Caucasus.

Branches many, stout, flexuous, 2–6 in., from a woody stock, scaly at the base, but not rooting. *Leaves* rarely 1 in., elliptic-lanceolate, almost succulent; stipules silvery, obtuse, acute or acuminate. *Perianth* very thick, lobes with white margins. *Nut* $\frac{1}{10}$ in. long; ovate, compressed or obtusely trigonous, black, shining, usually compressed and obtuse in Indian examples.—Boissier adopts the later name of *P. alpestre* for this, because Meissner described his *cognatum* from a variety (*P. rupestre*, Kar. and Kiril.) with longer pedicels. He further refers the Himalayan plant to Meissner's var. *ammannioides*, a Persian form with shorter internodes, and smaller narrower leaves; but the majority of Indian specimens do not differ from the common form.

6. **P. paronychioides**, *C. A. Mey. En. Pl. Talysch.* 20; rootstock very stout woody, branches short tufted erect and ascending scaberulous young concealed by the stipules, internodes very short, leaves linear with a deciduous mucro margins recurved, stipules large hyaline lanceolate tumid 2-nerved tip lacerate, pedicels short jointed at the tip, fruiting perianth urceolate lobes rounded shorter than the tube 2 outer awned at the back. *Boiss. Fl. Orient.* iv. 1040; *Meissn. in DC. Prodr.* xiv. 1. 89. P. Paronychia, *C. A. Mey. Enum. Pl. Cauc.* 158 (*not of Cham. & Schl.*). P. Meyeri, *Steud. Nomencl.* P. mucronatum, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 115.

WESTERN HIMALAYA, in the drier regions; Kunawur to Zanskar, alt. 8–12,000 ft., *Royle*, &c.—DISTRIB. Affghanistan, Persia.

Root or rootstock often as thick as the middle finger, tortuous, woody, with chestnut scaling back. *Stem* 1–4 in., fragile, white or red-brown, not grooved. *Leaves* ¼ in., nerveless, glabrous or scaberulous; stipules in young plants concealing both leaves and stem, lower with often two very faint included nerves, upper with two strong exserted ones. *Fruiting-perianth* as in *P. cognatum*, but shorter. *Nut* $\frac{1}{12}$ in., broadest in the middle, black, smooth.—The character of the dorsally mucronate outer sepals appears pretty constant, though not referred to by authors.

7. **P. salicornioides**, *Jaub. & Spach. Ill. Pl. Orient.* t. 123; shrubby, scaberulous, branches stout divaricate grooved at length spinescent and leafless, internodes crowded, leaves minute fleshy linear ovate or oblong rigid 1-nerved margin revolute, stipules short hyaline lacerate, perianth rosy, nut large thick opaque punctate. *Meissn. in DC. Prodr.* xiv. 1. 90; *Boiss. Fl. Orient.* iv. 1042.

SCINDE, *Vicary*.—DISTRIB. Persia.

The specimen is very imperfect, and I have taken much of the specific character from Boissier.

** *Root mostly annual* (*except some forms of* P. plebejum).

8. **P. aviculare**, *Linn.*; *Boiss. Fl. Orient.* iv. 1036; glabrous, branches procumbent or ascending grooved leafy, leaves elliptic or elliptic-oblong or -lanceolate obtuse flat nerveless, stipules shorter than the internodes hyaline lacerate many-nerved, flowers axillary, pedicel short jointed at the tip, perianth obovoid cleft to near the base, nut ovoid obtusely 3-gonous minutely rugosely striolate. *Bab. in Trans. Linn. Soc.* xviii. 114. P. aviculare γ. diffusum, *Meissn. in DC. Prodr.* xiv. 1. 97.

WESTERN HIMALAYA; from Kashmir to Kumaon, alt. 6–10,000 ft., *Royle*, &c.; Rawul Pindee, *Aitchison*. WESTERN TIBET, alt. 10–12,000 ft., *Thomson*, &c.—DISTRIB. Widely dispersed, indigenous in Europe and N. Asia, probably a colonist elsewhere.

The Himalayan and Tibetan specimens are intermediate in several points between *P. aviculare* and *P. Bellardi*, as these are defined by Boissier; the leaves are not veined as he describes them in *aviculare*, nor are they acute as they should be in *P. Bellardi*; and though the branches sometimes run out into a subspicate inflorescence, this is not so slender and interrupted as in true *Bellardi*. Boissier gives "India borealis" as a habitat for the latter plant; but I have seen no specimens.

9. **P. tubulosum**, *Boiss. Diagn. Ser.* i. 83, and *Fl. Orient.* iv. 1032; glabrous, branches short prostrate or ascending leafy angular not grooved, internodes very short, leaves linear acute or obtuse margins recurved, stipules hyaline subentire lacerate or fimbriate faintly 1–2-nerved, flowers axillary sessile, perianth ovoid tube much longer than the small rounded white or pink lobes, nut rhomboid triquetrous smooth shining. *Meissn. in DC. Prodr.* xiv. 1. 91. P. rottboellioides, *Jaub. & Sp. Ill. Pl. Or.* t. 122; *Meissn. l. c.* 92. ? P. Olivieri, *Meissn. l. c.* 92, *in part*.

NORTH-WESTERN HIMALAYA; Kunawur and Lahul, alt. 6–7000 ft., *Royle*, *Thomson*, *Stewart*. WESTERN TIBET, alt. 10–11,000 ft., *Thomson*.—DISTRIB. Affghanistan, Persian Alps.

A small annual, with sometimes rosy flowers, crowded leaves and hyaline stipules, ⅙ in. long, very different from *P. aviculare* in the sessile perianth cleft at the top only, and in the small broad short shining nut.—Meissner has cited "Kunhou, Strachey and Winterbottom, No. 49," as a locality for *P. Olivieri*, Jaub. and Spach. I have seen no specimens, and suspect some error. The calyx-lobes of *P. Olivieri* (which is a synonym of *P. polycnemoides*) equal the tube.

Var. *tibetica*; branches very slender much longer, leaves usually acute or acuminate.—Western Tibet; Karakoram, alt. 12,000 ft., *Clarke*; Lahul, *Jaeschke*; Chamba, *Ellis*.

10. **P. molliæforme**, *Boiss. Diagn. Ser.* i. 7. 84, and *Fl. Orient.* iv. 1043; very small and slender, stems short dichotomous bearing axillary clusters of stipules and flowers, leaves spreading linear setaceous apiculate 3–5-nerved margins recurved, stipules ventricose hyaline white 1–2-nerved split to the middle into several lanceolate segments, perianth sessile concealed by the stipules cleft to below the middle, nut ovoid acute obtusely 3-gonous. *Meissn. in DC. Prodr.* xiv. 1. 91.

WESTERN TIBET; Nubra, alt. 14–16,000 ft., *Thomson*.—DISTRIB. Persia.

Root almost capillary. *Stems* spreading, 1–2 in., filiform, rigidly flexuous, red. *Leaves* very narrow, ¼–⅓ in. long; stipules large for the size of the plant. *Flowers* minute. *Perianth* hyaline.—This curious little species resembles a seedling state of *P. paronychioides*, but differs in the perianth. Boissier describes the stipules as nerveless, but I find 1 or 2 nerves, one always exserted, in both Persian and Tibetan specimens.

11. **P. plebejum**, *Br. Prodr.* 420; diffusely branched, prostrate, smooth or minutely scaberulous, branches terete grooved, internodes usually shorter than the leaves, stipules hyaline short lacerate to the middle and fimbriate nerve unilateral excurrent (rarely 2 or more or 0), flowers 1–3-nate, pedicels 0 or short, perianth $\frac{1}{10}$ in. or less cleft to near the base, nut rhomboid 3-gonous smooth and shining. *Meissn. in DC. Prodr.* xiv. 1. 94. P. Dryandri, *Spr. Syst. Veg.* ii. 255; *Wall. Cat.* 1691; *Meissn. Polyg. Prodr.* 88. P. aviculare, *Don Prodr.* 72. P. herniarioides, *Del. Fl. Ægypt.* 13; *Meissn. l. c.* 94, and in *Wall. Pl. As. Rar.* iii. 62. P. Roxburghii, *Meissn. l. c.*; *Miquel Fl. Ind. Bat.* i. 997.

Throughout TROPICAL INDIA; and (but rarely) ascending the HIMALAYA to

7000 ft., from Bhotan to Kashmir (absent in Ceylon).—DISTRIB. Affghanistan, Tropical Asia, Java, Philippines, Australia, Madagascar, Egypt, Tropical and S. Africa.

If (following Wallich's example for most of them) I am right in bringing all the following forms under one species, this is a far more protean plant than *P. aviculare*, with which it is generally compared, but from which it differs entirely in habit, in the few-nerved stipules, and rhombic smooth nut. I have spent some days in analyzing the flowers and fruit of the vast number of specimens of it at my disposal, in the vain attempt to discover constant even varietal characters amongst them. The utmost I can effect is to select eleven forms, the extremes of which differ so much from one another that I have described them as varieties, though there is not one of these that does not seem to pass insensibly into two or more others, and I regard my work as provisional only. If any one is specifically distinct, it is var. *Miquéliana*, with its larger flowers and all the sepals acute; I have, however, seen no other specimens than Hohenacker's; and the shape of the sepals is so variable with age in other species, that much importance must not be attached to them. Var. *micranthema*, with nuts sometimes only 1/10 in. long, at first sight appears very distinct, but there are transitions of all its characters (nuts included) into those of the commoner forms. For the rest I must leave the further elucidation of this aggregate species to local botanists working on fresh specimens. In the matter of the citation of published works and Herbarium numbers, &c., I have been very sparing, because I cannot reconcile in several cases Meissner's descriptions and references with the specimens of Wallich, and with other authors' writings; and the diagnoses of the earlier authors are vague and incomplete. Though described as annual, the root is so often woody, that I think it must be at times biennial or even perennial.

P. plebejum proper; branches stout or slender, stipules rather short lower internodes often longer than the leaves upper shorter or very short, leaves ⅛ to ⅓ in. upper often much shorter oblong or linear obtuse margin often recurved, flowers sunk amongst the stipules rarely exserted, sepals short broad rounded. P. illecebroides, *Meissn. l. c.* 94. P. cliffortioides, *Meissn. l. c.*, and in *Wall. Pl. As. Rar.* iii. 62. P. herniarioides, *Herb. Strach. & Winterb.* 23. P. Roxburghii, *var.* brevifolia & pedicellaris, *Meissn. l. c.* 93.

Common from Assam to the N.W. Provinces and on the lower hills.—This is intended to include all the forms known to me that do not better agree with the diagnosis of the following ones. It is a common African and Australian plant. To it I should refer Wallich's 1691/1, 1691/3, 1691/4, the lower left-hand specimen, 1691/5, *except the Prome specimen*, and 1691 G, I, K.

Var. *effusa*; lax, slender, flaccid, internodes longer, leaves narrowly linear or dilated upwards from a very narrow base tip rounded, flowers all or most pedicelled, sepals short broad. P. effusum, *Meissn. l. c.* 93, *in part.*—Bengal to Bombay, Guzerat and N.W. India. Kumaon, *Herb. Strach. & Winterb.* 22.—Probably a native of wet places, whence its characters. Strachey and Winterbottom's specimens are characteristic, but Wallich's 1691/8 from Oude appears to me to be nothing but common *plebejum*.

Var. *indica*; branches uniformly spreading all round from the crown and leafy, internodes short, leaves ¼–½ in. uniformly spreading horizontally linear- or obovate-oblong flat obtuse or apiculate, stipules very short, flowers crowded in the axils, pedicels shorter than the perianth or 0, sepals broad 2 outer acute, nut 1/12 in. P. indicum (& ? P. linifolium), *Heyne in Roth Nov. Sp.* 208; *Wight Ic.* t. 1808; *Dalz. & Gibs. Bomb. Fl.* 214. P. Roxburghii, *var. α.* longifolium & *γ.* spathulatum, *Meissn. l. c.* 93. P. Dryandri, *Wall. Cat.* 1691 H, L.—The common Mysore and Carnatic form, also occurring in Bombay. When more irregular in development of leaves and branches not distinguishable from *P. plebejum* proper. Both habit and locality point to its being *P. indicum* of Roth, who describes the occasional scabridity of the end of the leaf as serrulation, and suspects its identity with *P. plebejum*. It is a common Australian and African form.

Var. *brevifolia*; rootstock very woody, branches very stout grooved often 1–2 ft. dark brown, internodes of branchlets very short concealed by the leaves and stipules which latter show as a continuous white villous band on the underside of the branchlets, leaves ⅛–¼ in. obovate acute or apiculate flat coriaceous dark brown when dry, flowers sessile almost concealed by the stipules, sepals narrower outer acute, nut $\frac{1}{12}$–$\frac{1}{15}$ in. P. Dryandri, *Wall. Cat.* 1691/5, *from Prome.*—From Bengal (Griffith, Kew Distrib. 4098) to Garwhal, Banda, Bombay, Scinde, Guzerat and Prome. Also in Africa.—This is a short crowded leaved form allied to *indica*, and differs from *Griffithii* in its stoutness and narrower longer leaves, which are not so covered by the stipules.

Var. *Griffithii*; branches excessively numerous from the root very slender flexuous and quite naked below, branchlets very slender with the internodes so close that they look woolly from the crowded fimbriate and crinite stipules, leaves shorter than the stipules $\frac{1}{10}$–$\frac{1}{8}$ in. orbicular or broadly obovate flat apiculate, flowers subsessile minute hidden amongst the stipules, sepals rounded 2 outer apiculate, nut not seen.—East Bengal, *Griffith* (*Kew Distrib.* 4099, 4101); plains of N.W. India, *Falconer* (*Kew Distrib.* 268).—A very singular form, probably a modification of var. *brevifolia*, with the bases of the branches buried in soil, and hence leafless and very slender.

VAR. *scindica*; branches rather stout flexuous pale red brown with scattered leaves below, branchlets slender, internodes very short woolly from the crinite stipules, leaves $\frac{1}{10}$–$\frac{1}{8}$ in. elliptic-oblong pale obtuse margins strongly recurved, flowers very minute sessile sunk amongst the stipules, sepals narrow obtuse, nut half the length of the perianth $\frac{1}{24}$ in. long black.—Scinde, *Stocks*.—This has much the habit of some common forms of the species, but the branchlets are crinite as in *Griffithii*, and the nut very minute. No doubt it is only one of many forms to be found in Scinde.

Var. *elegans*; black when dry, branches stout grooved smooth or scaberulous, internodes longer or shorter than the leaves, stipules brownish fimbriate, leaves $\frac{1}{2}$–$\frac{2}{3}$ in., upper as long as the lower linear-lanceolate acute or acuminate rarely obtuse, margins flat or revolute, flowers sessile or shortly pedicelled, sepals narrow 2 outer acute. P. elegans, *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 291. P. prostratum, *Roxb. mss.* P. ciliosum, *Meissn. l. c.* 95. P. Dryandri, *Wall. Cat.* 1691/2.—From Bengal, Assam and Bhotan to Nepal, Belgaum, Chittagong and Tenasserim.—Usually rather a large form, passing into *plebejum* proper by insensible transitions. The dark colour when dry, long narrow acuminate leaves and narrow sepals distinguish typical specimens. It is well described by Roxburgh and figured in his unpublished Icones (as *P. prostratum*). It occurs in Australia.

Var. *micranthema*; small, branches 2–8 in. very slender, stipules short, leaves $\frac{1}{4}$–$\frac{1}{3}$ in. linear or linear-oblong obtuse base narrowed flat, upper crowded as long as the often distant lower, flowers very minute pedicelled crowded in the upper axils, pedicel often as long as the perianth, sepals narrow obtuse, nut $\frac{1}{40}$–$\frac{1}{20}$ in. P. Dryandri *Wall. Cat.* 1691/4, *the upper left-hand specimen from Kumaon.* P. micranthemum, *Franchet mss.*—Birma, *Griffith*; Bengal and Silhet, *Clarke*; Soane River sands, *J. D. H.*; Kumaon.—This is only a small state of *plebejum*, into which it passes by insensible gradations. Franchet named it as above from Mongolian specimens.

Var. *Miqueliana*; branches rather stout flexuous straggling dark when dry, internodes longer than the leaves, stipules short 2-nerved, leaves $\frac{1}{4}$ in. obovate or oblong-obovate or linear-oblong obtuse flat, flowers 1–2 in the axils, pedicels slender longer than the perianth jointed towards the base, sepals narrow all acute, nut $\frac{1}{10}$ in. P. Miquelianum, *Meissn. Pl. Hohenack.*, No. 1613, and in *DC.* [illegible]. 92.—Canara; near Mangalor.—A very distinct variety, but more material is wanted to judge of its constancy. Meissner describes the stipules as 6-nerved, and the margins of the leaves as revolute, neither of which is the case in my specimens. Nor do I know of many-nerved stipules in any Indian form of *P. plebejum* except the following, which singularly enough comes from Mangalor, has revolute leaf-margins, and all the sepals acute.

Var. *polyneura*; branches straggling dark when dry, internodes longer or shorter than the leaves, stipules 4–6-nerved, leaves $\frac{1}{8}$ in. linear oblong acute or obtuse margins recurved, flowers 1–2 in the axils, pedicels as long as the perianth jointed at the base, sepals narrow acute, nut $\frac{1}{10}$ in. P. elegans, *Miquel in Herb. Hohenacker*, No. 19 (*not of Roxb.*). P. Roxburghii, *var.* longifolia, *Meissn. l. c.* 93.—Canara; near Mangalor.

Sect. IV. AMBLYGONON, *Meissn.* Erect or ascending herbs. *Leaves* large; stipules with often a dilated mouth. *Flowers* in cylindric spikes or racemes; bracts tubular. *Perianth* 4–5-partite. *Stamens* 5–8, alternating with glands. *Styles* 2–3, short, stigmas capitate. *Nut* orbicular, compressed; embryo slender, cotyledons narrow incumbent.

12. **P. orientale,** *Linn.*; *Meissn. Monog. Polyg.* 53, t. 1, f. 30–35, and t. 3, and in *DC. Prodr.* xiv. 1. 123; tall, branched, softly pubescent or silkily villous, leaves long-petioled ovate or ovate-cordate acuminate, stipules short, strigose and ciliate, racemes cylindric laxly panicled, bracts close 3–6-fld. *Bot. Mag.* t. 213; *Gærtn. Fruct.* ii. t. 119, f. 5; *Miquel Fl. Ind. Bat.* i. 1005; *Bab. in Trans. Linn. Soc.* xviii. 99. P. altissimum, *Mœnch. Meth.* 630. P. amœnum, *Bl. Bijd.* 531. P. pilosum, *Roxb. Hort. Beng.* 20, and *Fl. Ind.* ii. 286; *Wall. Cat.* 1710, *excl.* C. P. cochinchinense, *Meissn. Monog. Polyg.* 55. P. torquatum, *De Bruyn in Pl. Jungh.* 303. Lagunea cochinchinensis, *Lour. Fl. Coch.* i. 271.—*Rheede Hort. Mal.* xii. t. 76.

Wet places from ASSAM and SILHET westwards to OUDH and JAMU; ascending the Himalaya to 5000 ft.—DISTRIB. Siam, Java, Borneo, China, Japan, Turkestan (often cultivated).

A branching annual, 3–10 ft.; branches hollow. *Leaves* 6–9 by 2–5 in., grey with hairs; nerves very numerous; petiole 1–4 in.; stipules short, hirsute, truncate, mouth membranous or dilated herbaceous and recurved. *Racemes* 3–5 in., on long stout strict peduncles and pedicels, erect or cernuous; bracts crowded strigosely tomentose and ciliate; flowers large, white red or green. *Stamens* 7–8, included. *Styles* connate below, stigmas capitellate. *Nuts* ⅛ in. diam., orbicular, flattened with rounded margins and rather concave faces, black, shiny, pericarp very thick. *Cotyledons* incumbent.—Roxburgh remarks that the ends of the branches when moistened become thickly glutinous.

Var. *glabrata*; very sparsely pubescent or glabrate, petiole narrowly winged.—Kashmir, *Thomson*; Saharunpore Bot. Garden, *Royle, Falconer*.

Var. *parvifolia*; sparingly pubescent, leaves 2–3½ in. elliptic acuminate membranous, petiole winged, stipules very short, mouth herbaceous. *Wall. Cat.* 1709/2 (*under P. tomentosum*).—Silhet, *De Silva*.—I have seen no other specimen. A note on the specimen says the shoots are eaten and have a sour taste.

13. **P. tomentosum,** *Willd. Sp. Pl.* ii. 447; stem simple very stout erect pubescent or glabrous, leaves 4–8 in. shortly petioled lanceolate finely acuminate silky beneath rarely glabrate, stipules strigose truncate mouth erect with rigid bristles half their length or less, racemes stoutly peduncled panicled, bracts crowded hispid and ciliate. *Meissn. in DC. Prodr.* xiv. 1. 124, *excl. var.* β; *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 287; *Miquel Fl. Ind. Bat.* i. 1006; *Wall. Cat.* 1709, *excl.* B, E, G, H, *and part of* D. P. orientale, *Wall. Cat.* 1710 C. P. ochreatum, *Houtt. Pfl. Syst.* vi. 442, t. 49, f. 1. P. pulchrum, *Blume Bijd.* 530.

In ditches, &c., from BENGAL, ASSAM and CACHAR, southwards to MALACCA; and from BOMBAY to MALABAR and CEYLON.—DISTRIB. Java, Philippines, Trop. and S. Africa.

Stems one or more from a prostrate rooting annual stock, 2–4 ft., often as thick as the finger. *Leaves* 1–1½ in. diam., usually pubescent or subsilky above; petiole rarely ½ in.; stipules ½–1 in., membranous. *Racemes* 2–4 in., always erect, strict; bracts 6–8-fld.; flowers large, white. *Stamens* 7–8. *Nut* large, ⅙ in. diam., orbicular flattened with rounded margin and convex faces; pericarp very thick, crustaceous, black, shining; cotyledons incumbent.—This is apt to be confounded with *P. barbatum*. Meissner quotes Wall. Cat. 1708 A, and 1708 G, I, for this, but the first and last are certainly *barbatum*, and only one piece of G appears to be *tomentosum*.

14. **P. limbatum,** *Meissn. in DC. Prodr.* xiv. 1. 123; stem simple

very stout erect, leaves 4–8 in. shortly petioled lanceolate acuminate scaberulous on both surfaces, stipules strigose truncate mouth with a spreading or recurved herbaceous scabrid ciliate limb, racemes stoutly peduncled panicled, bracts crowded hispid. *Boiss. Fl. Orient.* iv. 1031.

BENGAL; in the Jheels, *J. D. H. & T. T.*; Maldah, *Clarke*. UPPER GANGETIC PLAIN, *Thomson*. GARWHAL, *Edgeworth*. CONCAN, *Law*.—DISTRIB. Egypt, Trop. Africa.

Habit, inflorescence and nut of *P. tomentosum*, but the leaves in all the specimens are minutely scabrid on both surfaces, and the stipules have constantly a herbaceous limb. Fruit and pericarp as in *P. tomentosum*, and cotyledons incumbent.

Sect. V. TOVARA, *A. Gray*. A tall herb with perennial root. *Leaves* broad; stipules tubular. *Flowers* in a very slender raceme; bracts tubular. *Perianth* 4-partite. *Stamens* 5, alternating with glands. *Styles* 2, long, rigid, hooked, persistent, stigmas simple. *Nut* flattened; cotyledons accumbent.

15. **P. virginianum**, *Linn.*; *Meissn. Monog. Polyg.* 81, t. 1 I, f. 27–29, t. 3 N, and in *DC. Prodr.* xiv, 1. 112; sparsely hispid, leaves 4–10 in. short-petioled elliptic or elliptic-lanceolate, stipules short hispid, racemes 6–16 in., bracts distant 2-fid. P. filiforme, *Thunb. Fl. Jap.* 163; *Meissn. Monog.* 75, and in *DC. l. c.* P. muticum, *Mœnch Suppl.* 266. Persicaria virginiana, *Gærtn. Fruct.* ii. t. 119, f. 3.

TEMPERATE HIMALAYA, very rare, *Falconer*; Kashmir, on the Jhelum River, alt. 2–4000 ft., and Pir Panjal, alt. 7–10,500 ft., *Stewart*; Sikkim, on the Balesun River, alt. 7–8000 ft., *King*.—DISTRIB. China, Japan, Eastern United States.

Stem 5 ft. and upwards, branches hollow. *Leaves* thin, base acute, nerves many, slender; petiole ¼–1 in.; stipules ¼–½ in., mouth truncate and ciliate. *Racemes* long-peduncled, very long and slender; bracts ciliate, ½–1 in. apart; bracteoles narrow, hyaline; pedicels ⅛ in., rigid, stout in fruit. *Perianth* eglandular, thin. *Fruit* ellipsoid, flattened, pale brown, as long as the persistent styles.—The long hooked persistent style free to the base, serving to attach the fruit to foreign bodies, is unique in the genus, and indicates that the species should form a separate section (it is singular that though provided with so obvious a means of transport the species should be so rare in India). I find no difference between the Himalayan and East American plants; the W. Asiatic and some American have shorter and blunter leaves. The Sikkim specimen has leaves sparsely strigillose on both surfaces, as in some American ones, others of both countries are nearly glabrous.

Sect. VI. BISTORTA, *Tourn.* Perennial eglandular herbs, erect with simple stems from a woody rootstock, or with branching prostrate stems and erect leafy scapes. *Leaves* broad or narrow; stipules tubular, eciliate. *Flowers* in spiciform racemes, eglandular; bracts membranous, ovate or lanceolate, open not tubular nor truncate. *Perianth* 4–5-partite, not enlarged in fruit. *Stamens* 4–10. *Styles* 2–3, long, slender, free; stigma simple. *Nut* trigonous or biconvex; cotyledons accumbent.

* *Stem solitary, simple, erect from a woody rootstock.*

16. **P. viviparum**, *Linn.*; *Boiss. Fl. Orient.* iv. 2027; root-leaves long-petioled linear or linear-oblong acute or obtuse crenulate base acute obtuse or cordate, spikes solitary erect slender, flowers suberect pink, the lower replaced by bulbils. *Meissn. in Wall. Pl. As. Rar.* iii. 53, and in *DC. Prodr.* xiv. 1. 124; *Fl. Dan.* t. 13. P. angustifolium, *Don Prodr.* 70. P. bracteatum, *Spreng. Cur. post.* 154. P. bulbiferum, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 94; *Meissn. in DC. l. c.* 125. P. affine,

Wall. Cat. 1683/3, *not of Don.* P. bistorta, *Garcke in Bot. Reis. Pr. Waldem.* 135.

ALPINE and SUBALPINE HIMALAYA, from Kashmir to Sikkim, &c. WESTERN TIBET, alt. 9–15,000 ft.—DISTRIB. Alpine North and Arctic Europe, Asia and America.

Rootstock woody, as thick as the thumb or less; stem 4–12 in., slender. *Leaves* very variable, 1–6 in., coriaceous, sometimes pubescent or even tomentose beneath; cauline sessile, erect. *Spikes* 1–4 in. long; bracts ovate, acuminate. *Perianth* very variable in size. *Stamens* included or exserted. *Styles* filiform, slender, free and included or greatly lengthened and connate below. *Nut* very small, trigonous or biconvex.—Probably an Alpine state of *P. bistorta.*

17. **P. sphærostachyum,** *Meissn. Monog. Polyg.* 53, and in *Wall. Pl. As. Rar.* iii. 52, and in *DC. Prodr.* xiv. 1. 125; root-leaves long-petioled linear or linear-oblong acute or obtuse crenulate base acute or obtuse, spikes solitary erect stout cylindric or capitate very dense-fld., flowers crimson drooping. *Bot. Mag.* t. 6847. P. macrophyllum, *Don Prodr.* 70; *Bab. in Trans. Linn. Soc.* xviii. 95. P. gracillimum, *Spreng. Cur. post.* 154. P. tenue, *Don l. c.* P. stenophyllum, *Meissn. in DC. l. c.* P. splendens, *Klotzsch in Bot. Reis. Pr. Wald.* t. 88. P. affine, *var.* angustifolium, *Wall. Cat.* 1683.

TEMPERATE and SUBALPINE HIMALAYA; from Scinde to Sikkim, alt. 11–15,000 ft. WESTERN TIBET, Heyde.

The dense spike of brilliantly coloured drooping flowers is the best character for this beautiful plant; I am very doubtful about some of the synonyms cited for it and for *P. viviparum*, especially as to Don's *angustifolium, tenue & gracillimum.*

18. **P. perpusillum,** *Hook. f. Ic. Pl.* t. 1490 A; very dwarf, glabrous, radical leaves subsessile narrowly linear obtuse margins recurved quite entire, scape very slender 1-leaved, flowers few capitate pendulous, sepals 4 unequal, stamens 1–3 perfect, nut trigonous or biconvex.

ALPINE HIMALAYA, alt. 12–15,000 ft.; Sikkim, *J. D. H.*; Kumaon and Garwhal, *Strachey & Winterbottom* (*Polyg. No.* 39), *Duthie.*

Subcæspitose; rootstock stout, clothed with membranous torn stipules. *Leaves* $\frac{1}{4}$–$\frac{3}{4}$ by $\frac{1}{20}$ in., spreading; stipules 2-fid. *Scape* $\frac{1}{4}$–$1\frac{1}{2}$ in., erect; head $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; flowers $\frac{1}{16}$ in. long, white or pink; bracts crowded, obtuse; pedicel short, jointed at the top. *Sepals* broad, obtuse, very unequal, inner orbicular or oblong. *Styles* 2–3, nearly free, stigmas capitate. *Nut* pale, smooth.—A very singular little species, allied to *P. sphærostachyum*; variable in number of stamens, some of which are reduced to capitellate filaments, and in the form of the sepals and fruit.

19. **P. paleaceum,** *Wall. Cat.* 1684; root-leaves long-petioled linear-oblong or -lanceolate crenulate base very narrow, spike solitary erect stout cylindric, flowers crowded suberect pink. P. confusum, *Meissn. in Wall. Pl. As. Rar.* iii. 53. P. carneum, *C. Koch in Linnæa,* xxii. 197.

KHASIA MTS.; alt. 4–6000 ft., abundant.

Rootstock as thick as the thumb; stem 6–16 in., slender. *Leaves* 3–9 in., very variable in breadth, obtuse or acute, base always narrowed into the slender petiole. *Spikes* 1–2 in.; flowers crowded; bracts ovate, acuminate, scarious.—Very nearly allied to *P. bistorta,* but the leaves are always very gradually narrowed to the base, not forming broad wings below the base as usual in the European plants. This species is omitted by Meissner in the Prodromus.

** *Perennial herbs with tufted or creeping branched rootstocks and erect simple rarely branched flowering stems bearing erect spikes.*

20. **P. amplexicaule,** *Don Prodr.* 70; glabrous, densely tufted,

flowering stems 2–3 ft. very slender, leaves large long-petioled ovate-cordate caudate-acuminate crenulate upper amplexicaul, racemes very long-peduncled erect, bracts ovate, styles free slender. *Meissn. in Wall. Pl. As. Rar.* iii. 54, and in *DC. Prodr.* xiv. 1. 126; *Bab. in Trans. Linn. Soc.* xviii. 96; *Bot. Reg.* 1839, t. 46; *Bot. Mag.* t. 6500. P. oxyphyllum, *Wall. Cat.* 1715; *Meissn. ll. c.* P. ambiguum, *Meissn. ll. c.*; *Wight Ic.* t. 1797. P. petiolatum, *Don l. c. fid. Bab.*

TEMPERATE HIMALAYA; from Murree, alt. 6–8000 ft., to Sikkim, alt. 9–13,000 ft. *Rootstock* stout, woody, branched. *Stems* 2–3 ft., green, sparingly leafy. *Lower leaves* 3–6 in. long, minutely papillose beneath, especially on the nerves; stipules 1–2 in., narrow, tips torn. *Racemes* 1–2, 2–6 in. long. *Flowers* red, white or greenish-white, ⅙–¼ in. diam. *Stamens* 8, anthers exserted. *Ovary* 3-gonous.

Var. *speciosa*; flowers larger, ⅓ in. diam., deep purplish-red or claret-coloured. P. speciosum, *Wall. Cat.* 1716; *Meissn. ll. c.*—Occurs throughout the range of the species, and is the only form found hitherto in Sikkim, the specimens from whence are very stout. In Nepal it occurs in a large branched form.

21. **P. affine,** *Don Prodr.* 70, *excl. syn.*; glabrous, densely tufted, flowering stems 4–12 in., leaves sessile or shortly petioled linear- or elliptic-lanceolate or oblanceolate acute or obtuse crenulate glaucous beneath cauline few, racemes shortly peduncled stout erect, flowers suberect, styles free slender. *Meissn. Monog. Polyg.* 52, and in *DC. Prodr.* xiv. 1. 126; *Bab. in Trans. Linn. Soc.* xviii. 97; *Bot. Mag.* t. 6472. P. Brunonis, *Wall. Cat.* 1692; *Royle Ill.* 317, t. 80, f. 3; *Meissn. in Wall. Pl. As. Rar.* iii. 54; *Lindl. & Paxt. Fl. Gard.* ii. t. 37; *Lemaire Jard. Fleur.* t. 117. P. Donianum, *Spreng. Syst. Cur. post.* 154.

ALPINE and SUBALPINE HIMALAYA; from Kashmir, alt. 8–14,000 ft., eastward Kumaon, alt. 11–13,000 ft. WESTERN TIBET.

Rootstock woody, long, branched, often tortuous, and 4–8 in. long; crown clothed with scarious old stipules. *Leaves* chiefly radical, 2–4 in., narrowed into the petiole, finely reticulate, margins recurved; stipules ½–1 in., entire or split, many-nerved, brown. *Peduncles* 3–8 in., usually stout. *Racemes* 2–3 in., obtuse, flowers crowded, rosy, ⅙–¼ in. diam. *Sepals* elliptic-oblong. *Nut* 3-gonous.—Iskardo and Kashmir specimens attain 16 in. in height.

22. **P. vacciniifolium,** *Wall. Cat.* 1695; tufted, glabrous, branches trailing and creeping, leaves shortly petioled small orbicular or elliptic acute at both ends or acuminate quite entire, stipules rigid laciniate with many long strong excurrent nerves, racemes subsessile, styles filiform, free. *Meissn. in Wall. Pl. As. Rar.* iii. 54, and in *DC. Prodr.* xiv. 1. 126; *Royle Ill.* 317, t. 80, f. 2; *Bab. in Trans. Linn. Soc.* xviii. 96; *Lindl. & Paxt. Fl. Gard.* ii. 37; *Bot. Mag.* t. 4622.

TEMPERATE and SUBALPINE HIMALAYA; from Kashmir to Bhotan, alt. 9–14,000 ft. WESTERN TIBET; Ladak, alt. 14–16,500 ft., *Stewart.*

Rootstock sometimes as thick as the little finger and twisted, usually longer more slender and much branched; branches leafy. *Leaves* ⅓–⅔ in., rather glaucous beneath; stipules ⅓–½ in., brown, giving a crinite appearance to the tips of the young branches. *Racemes* 1½–3 in.; bracts acuminate; flowers rose-red, ⅓ in. diam. *Stamens* at length exserted.—Meissner's vars. *obtusifolium*, *medium*, and *flagelliforme*, are not sufficiently distinguishable.

23. **P. emodi,** *Meissn. in Wall. Pl. As. Rar.* iii. 51, 54, t. 287, and in *DC. Prodr.* xiv. 1. 127; glabrous, rootstock elongate, branches trailing and creeping, leaves subsessile rigid linear-lanceolate acuminate at both ends quite entire striate-nerved, stipules long membranous acuminate many-nerved, racemes peduncled, stamens included, flowers pedicelled, styles free

filiform. *Bab. in Trans. Linn. Soc.* xviii. P. Meissneri, *Wall. Cat.* 1693.

Temperate Himalaya; from Dalhousie to Bhotan, alt. 8–11,000 ft.

Rootstock as thick as a goose-quill; branches 6–10 in., internodes often 1–1½ in., with short ascending leafy branches. *Leaves* 1½–2 in., margins recurved; stipules 1 in. *Racemes* 1–1½ in., few-fld.; bracts acuminate; flowers red. *Perianth* ⅙ in. long. *Stamens* 8. *Nut* ellipsoidly rhombic, angles very obtuse.

Sect. VII. Persicaria, *Meissn.* Erect or decumbent annual or perennial herbs. *Leaves* usually narrow; stipules tubular, often ciliate. *Flowers* in spiciform racemes, often glandular; bracts more or less tubular, usually truncate, often ciliate. *Perianth* 4–5-partite, not enlarged in fruit. *Stamens* 4–8, often alternating with glands. *Styles* 2–3, free or connate below, stigmas usually capitate. *Nut* trigonous or biconvex, cotyledons accumbent.

* *Styles* 2, *rarely* 3; *nut biconvex.* (See also *P. Hydropiper.*)

24. **P. glabrum,** *Willd. Sp. Pl.* ii. 447; glabrous, leaves 4–8 in. petioled lanceolate or linear-lanceolate finely acuminate glandular or not, stipules membranous eciliate glabrous, racemes slender panicled, peduncles usually quite glabrous, bracts rarely ciliolate. *Meissn. in DC. Prodr.* xiv. 1. 115, and in *Mart. Fl. Bras.* v. 1, t. 14; *Roxb. Fl. Ind.* ii. 287; *Bab. in Trans. Linn. Soc.* xviii. 102; *Wight Ic.* t. 1799; *Wall. Cat.* 1711; *Grah. Cat. Bomb. Pl.* 172; *Dalz. & Gibs. Bomb. Fl.* 214. P. Poiretii, *Meissn. in Wall. Cat.* 1712, &c. P. Persicaria, *Wall. Cat.* 1720.—*Rheede Hort. Mal.* xii. t. 77.

In ditches, &c., from Assam, Silhet and Bengal westward to the Indus and Scinde, and southward to Burma, ascending the Himalaya to 6400 ft. in Garwhal. Ceylon, common.—Distrib. Tropical Asia, Africa and America.

Stem 2–4 ft., sometimes as thick as the finger, rarely diffusely branched, often red. *Leaves* usually dark brown and shining when dry; stipules rarely with a few short cilia. *Racemes* 2–4 in., very slender; bracts truncate, tip oblong or rounded, few-fld. *Perianth* very variable in size, white or rosy. *Stamens* 6–8. *Nut* orbicular, biconvex, black, shining.—It is difficult to separate this from smooth forms of *P. Persicaria*, of which it is the tropical representative; it is, however, much larger, less branched, with more attenuate leaves brown when dry, and normally eciliate bracts and stipules. Meissner doubtfully cites under his var. *obscurum* (which is the common state of the plant in India) Roxburgh's *P. tenellum*, on the faith of a note of Wallich's in Herb. DC.; but the published *tenellum* of Roxburgh has filiform racemes and trigonous nuts, and is what I suppose to be *P. flaccidum*. Boissier points out (under *P. senegalense*) that the Affghan habitat attributed to this by Meissner is a mistake for Loodiana. Var. *glandulosissima*, Meissn., in Wall. Pl. As. Rar. iii. 57, and in DC. l. c., is the glandular-leaved state of the plant, and is the *P. fluviatile*, Herb. Ham. and Wall. Cat. 1711 E; the nut is trigonous in Hamilton's specimen.

Var. *scabrinervis*; peduncles often glandular above, leaves glandular, midrib beneath scabrid. P. scabrinerve, *Royle mss.*; *Meissn. l. c.* 121, *in part*; *Bab. l. c.* 101. P. quadrifidum, *Ham. in Wall. Cat.* 1711 F.—N.W. India, *Royle*; Soane River, *J. D. H.*; Bengal; Burma; Ceylon.—Hamilton's specimens have a deceased inflorescence.

Var. ? *macrantha*; leaves densely gland-dotted, midrib beneath scabrid, racemes very stout, bracts oblong, flowers nearly ¼ in. diam. rose-cold., styles 2 or 3.—Silhet station, *Clarke.*—The specimens are very indifferent, but I think referable to *P. glabrum.* It must be a handsome plant.

25. **P. amphibium,** *Linn.*; *Boiss. Fl. Orient.* iv. 1028; perennial, leaves usually floating oblong or lanceolate, stipules truncate ciliate or not, racemes solitary dense-fld., peduncles hairy, bracts eciliate, perianth

eglandular, fruit ovoid faces convex. *Meissn. in DC. Prodr.* xiv. 1. 115; *Fl. Dan.* t. 282.

WESTERN HIMALAYA, *Falconer*; Kumaon, alt. 6400 ft., *Strachey & Winterbottom*; Kashmir, *Thomson*.—DISTRIB. Westward to the Atlantic, N. Asia and America.

Rootstock creeping, woody. *Leaves* long petioled and floating, or subsessile and aerial, obtuse or acute, serrulate or ciliate, eglandular; stipules glabrous or hispid. *Racemes* very stout, 1–2 in. long; peduncle stout; bracts acute obtuse or cuspidate. *Sepals* ⅛ in., not nerved, bright red, much longer than the shining nut.

26. **P. lanigerum**, *Br. Prodr.* 419; much branched, clothed with snow-white cottony tomentum, leaves petioled or sessile narrowly lanceolate acuminate rarely glabrous above, stipules short truncate eciliate, racemes 1–2 in. slender, bracts small crowded glabrous or tomentose eciliate. *Meissn. in Wall. Pl. As. Rar.* iii. 55, and in *DC. Prodr.* xiv. 1. 117; *Benth. Fl. Austral.* v. 271; *Boiss. Fl. Orient.* iv. 1030; *Wall. Cat.* 1714. P. lanatum, *Roxb. Hort. Beng.* 29, and *Fl. Ind.* ii. 285. P. arachnoideum, *Klotzsch mss.*

In ditches, &c.; BENGAL, *Roxburgh*, ROHILKUND, *Wallich*, *Thomson*, and along the lower HIMALAYA from Sikkim to the Beas River; Belgaum, *Herb. Wight*.—DISTRIB. Java, Philippines, Egypt, Tropical and S. Africa and America, Australia.

Stem 2–5 ft., procumbent and creeping below, sometimes much thicker than the thumb; branches slender, much divided, divaricating, white, "deep red within, especially at the joints," *Roxb.* *Leaves* 4–8 in., finely acuminate, thickly cottony beneath; stipules membranous, mouth unequal. *Racemes* in slender divaricate cottony peduncles; bracts very small, obtuse or acute, and small red or white perianth eglandular. *Stamens* 6. *Nut* orbicular, small, flat, black, shining.—Roxburgh describes this as annual, Boissier calls it annual in his clavis and perennial in his description; others say perennial; the great size of the rooting base of the stem would indicate the latter.

Var. *glutinosa*; peduncles and perianth glandular. P. glutinosum, *Wall. Cat.* 1717; *Meissn. in Wall. Pl. As. Rar.* iii. 55, and in *DC. l. c.* 120.—Banks of the Irawaddy, *Wallich*.—This appears to me a form of *P. lanigerum* growing in dry places. The root is annual. S. Africa.

27. **P. lapathifolium**, *Linn.*; *Boiss. Fl. Orient.* iv. 1030; annual, erect, branched, leaves subsessile elliptic-ovate or lanceolate glandular beneath ciliolate, stipules sparingly ciliate, racemes dense-fld. erect or nodding, bracts eciliate; pedicels usually glandular, perianth greenish glandular nerves strong, stamens usually 6. *Meissn. in DC. Prodr.* xiv. 1. 119; *Reichb. Ic. Crit.* v. t. 495; *Engl. Bot.* t. 1382.

Plains of N. INDIA; var. *nodosa* from Lahore westwards to Kashmir, ascending the Himalaya to 7000 ft.; var. *laxa* from BENGAL to the Sutlej, ascending the Himalaya to 6000 ft. The CONCAN.—DISTRIB. W. and N. Asia, Europe, Africa, and America.

I am indebted to Mr. Baker for identifying the Indian forms of this and the following species, which present a series of varieties more or less representing the European ones described above, but none of them conforming to the typical *P. lapathifolium*. The var. *nodosa* is, he informs me, often very difficult to distinguish from *P. Persicaria*.

Var. *nodosa*; taller, more branched, spikes oblong, perianth reddish not so strongly veined, nut smaller. P. nodosum, *Pers.*; *Meissn. in DC. l. c.* 118. P. maculatum, *Dyer & Trimen*.

Var. *laxa*; spikes laxer cylindric. P. laxum, *Reichb. Ic. Crit.* v. 56, t. 492. P. nutans, *Roxb. Fl. Ind.* ii. 285. P. quadrifidum, *Herb. Strachey & Winterbottom, Polyg.* 24.

28. **P. Persicaria**, *Linn.*; *Boiss. Fl. Orient.* iv. 1030; annual, erect

or ascending, leaves subsessile elliptic-oblong or lanceolate eglandular, stipules usually hirsute and ciliate, racemes oblong dense-fld., bracts ciliate, pedicels glabrous, perianth red eglandular nerves slender, stamens usually 6. *Meissn. in DC. Prodr.* xiv. 1. 117; *Reichb. Ic. Crit.* v. 55, t. 491; *Engl. Bot.* t. 756.

WESTERN HIMALAYA; Kashmir, *Falconer*, &c. WESTERN TIBET, alt. 9–14,000 ft., *Thomson*, &c.—DISTRIB. N. and W. Asia, Europe, Africa, N. America.

Under *P. lapathifolium* I have alluded to the difficulty of distinguishing this plant from its var. *nodosa*, in India at any rate. I must leave a further study of the forms of both to Indian botanists, with living specimens to work upon.

29. **P. minus,** *Huds.*; *Meissn. in DC. Prodr.* xiv. 1. 111; slender, erect or ascending, glabrous, leaves sessile linear- or oblong-lanceolate subacute, stipules sparsely strigose truncate ciliate cilia much shorter than the tube, racemes erect filiform, bracts close rarely interrupted glabrous ciliate, perianth eglandular, nut polished. *Boiss. Fl. Orient.* iv. 1029; *Miquel Fl. Ind. Bat.* i. 1002. P. Posumbu, *Wall. Cat.* 1722 (*not of Ham.*). P. tenellum, *Blume Bijd.* 530. P. hypostictum, *Miquel in Herb. Hohen.*, No. 971. P. Banca, *Herb. Ham.* P. strictum, *Allioni*; *Wight Ic.* t. 1800.

Throughout the hotter parts of India, from ASSAM and CHITTAGONG to KASHMIR, and southward to TRAVANCORE, ascends the Himalaya to 6000 ft. CEYLON, ascending to 4000 ft.—DISTRIB. Europe, Temperate and Tropical Asia.

Stem sometimes creeping, 6–10 in. high or long, much branched or simple. *Leaves* usually under 2 in., glabrous or puberulous beneath, or minutely strigose on the midrib beneath; stipules ¼–⅓ in., with stiff closely appressed bristles. *Racemes* ½–1 in., erect; flowers minute. *Nut* orbicular.—The nuts are rather smaller than in European specimens, but I find no other difference. Wight describes the Nilghiri plant as 2–3-gynous and 5–6-androus. Small states of *P. serrulatum* are with difficulty distinguished from this.

30. **P. assamicum,** *Meissn. in DC. Prodr.* xiv. 1. 111; diffusely branched and creeping, and ascending, branches glabrous, leaves dark green when dry petioled elliptic-ovate or -lanceolate subacute or acuminate glabrous or with the nerves beneath setulose and margins ciliate, stipules strigose cilia as long as the tube, racemes 1–1½ in. very slender and on very slender pedicels, bracts interrupted glabrous truncate ciliate, perianth eglandular, stamens 5 or 6.

ASSAM, *Wallich*, *Masters*; CACHAR, *J. D. H.* & *T. T.*—DISTRIB. Burma, *Griffith*.

The prostrate habit, dark-green petioled broader leaves, longer cilia of the stipules and more slender interrupted racemes, at once distinguish this remarkable species, which has the colour of *P. tinctorium* when dry. The Burmese specimen is very much stouter than the Assam and Cachar ones, and has leaves 4 by 1½ in. The nut is like that of *P. minus*.

†† *Styles* 3, *rarely* 2. *Nut* 3-*gonous*, *rarely biconvex*.

31. **P. viscosum,** *Ham. in Don Prodr.* 71; annual, stem ascending and branches hirsute with spreading bristly hairs and glands, leaves shortly petioled lanceolate acute or acuminate strigose, stipules short hirsute, racemes 1–1½ in. erect, bracts close strigose and ciliate, perianth eglandular. *Meissn. Monog. Polyg.* 73; *in Wall. Pl. As. Rar.* iii. 55, and *in DC. Prodr.* xiv. 1. 102; *Wall. Cat.* 1713. P. strigosum & hirsutum, *Herb. Ham.*

NEPAL, *Hamilton*; KHASIA MTS., SILHET and CACHAR, *De Silva*, *Griffith*, &c.

Stem 1–3 ft., stout or slender, hollow, hairs flexuous, glandular or not. *Leaves* 2–7 in., glandular or not beneath, usually drying brown, stipules ⅓–½ in. *Racemes* rather slender; peduncles densely glandular; bracts short; flowers bright red, hardly exserted. *Stamens* 8. *Nut* broadly trigonous, black.—I find no character for Meissner's var. *verrucosum*, of which I think the varnish is due to the glue used in mounting the specimen.

Var. *minor;* smaller, weaker, more slender and sparsely hirsute, green when dry, leaves 1–1¼ in. elliptic-lanceolate obtuse. *Wall. Cat.* 1713 C.—Nepal (cult. in Hort. Bot. Calc.); Silhet.

32. **P. stagninum,** *Ham. mss.*; *Meissn. in Wall. Pl. As. Rar.* iii. 56, in *DC. Prodr.* xiv. 1. 104; stem erect or ascending and branches glabrous below above and peduncles subsilkily strigose, leaves 3–5 in. lanceolate or linear-lanceolate acuminate strigosely pubescent on both surfaces glandular or not beneath, stipules strigose cilia shorter than the tube, racemes strict erect, bracts close glabrous or strigose ciliate, perianth eglandular. P. tomentosum, *Wall. Cat.* 1709/4 *in part*, E, G, H. P. barbatum, *Wall. Cat.* 1708 F. P. Bishiræ, *Ham. mss.*; and P. conspersum, *Meissn. in Wall. Pl. As. Rar. l. c.*, and in *DC. l. c.* 102. P. hispidum, *Bab. in Trans. Linn. Soc.* xviii. 100 (*not of Don*). P. Hamiltonii, *Meissn. in DC. l. c.* 104, *excl. syn.* *P. hispidum*, (*not of Sprengel*). P. Goyalpara, *Herb. Ham.* P. Hornemanni, *Meissn. in DC. l. c.* 107.

Throughout the hotter parts of India, from CHITTAGONG, CACHAR and BENGAL to CHAMBA, ascending the Himalaya in Sikkim and Kumaon to 4000 ft. MYSORE, *Clarke*. PEGU and BURMA, *Wallich*.

Annual? *Stem* simple or branched. *Leaves* usually grey when dry, young often silky. *Racemes* stout or slender; peduncles usually long and stout; bracts glabrous or more or less (sometimes densely) strigose, very many-fld.; flowers white. *Styles* long, slender, connate below. *Nut* pitchy black.—Very near *P. barbatum*, and probably a form of it; but the peduncles are invariably strigose, the racemes and cilia of the stipules both shorter. Meissner refers Sprengel's *Hamiltonii* (which is Hamilton's *hispidum*) to the neighbourhood of *P. barbatum*, but I am disposed to place it under *P. flaccidum*, whilst the rest of Meissner's *Hamiltonii* comes here.

33. **P. barbatum,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 104; branches stout erect and peduncles glabrous, or nearly so, leaves 4–7 in. lanceolate or linear-lanceolate acuminate glabrous except the ciliolate margins and midrib beneath, stipules strigose cilia longer than the tube, racemes 2–4 in. slender erect, bracts close glabrous sparingly and shortly ciliate, perianth eglandular white, stamens 5–8. *Bab. in Trans. Linn. Soc.* xviii. 100; *Wall. Cat.* 1708, *excl. F*; *Wight Ic.* t. 1798; *Miquel Fl. Ind. Bat.* i. 999. P. rivulare, *Kœn.*, *Roxb. Fl. Ind.* iii. 290; *Grah. Cat. Bomb. Pl.* 172; *Dalz. & Gibs. Bomb. Fl.* 214. P. Hornemanni, *Meissn. in DC. l. c.* 107. P. Marmoramæ & fluviatile, *Herb. Ham.*

Throughout the hotter parts of India, from ASSAM to the INDUS, and southwards to MALACCA, PENANG and CEYLON.—DISTRIB. Tropical Asia and Africa.

The nearly or quite glabrous stems and peduncles, the long bearded stipules, long weak slender but erect racemes, and shorter weaker cilia of the bracts, best distinguish this from *P. stagninum*; but none of these characters holds good by itself, and I look to Indian botanists for further information. I am not certain that the synonymy of these plants is quite right, there is so much confusion between the names adopted by Hamilton, Wallich and Roxburgh, which last author has different names for the same plant in his Herbarium, his Icones and his Flora. The *barbatum* of "Flora Indica" is, I think, certainly what I have retained as *flaccidum*; that so called on his authority in Herb. Wallich is *P. Hydropiper*; that of his Icones is undoubtedly *P. tomentosum*; whilst in his Herbarium *P. barbatum* is labelled *P. aquaticum*, which suggests to me that it is the *rivulare* of "Flora Indica," of which there is a poor drawing in his Icones, representing a very narrow-leaved plant with short stipules and slender racemes of white flowers.

34. **P. serrulatum,** *Lagasc.*; *Boiss. Fl. Orient.* iv. 1028; stem prostrate and rooting below, branches and peduncles glabrous, leaves 2–4 in. subsessile linear- or elliptic-oblong or -lanceolate acute or acuminate, glabrous or sparsely hairy beneath, base rounded cordate or acute, stipules strigose cilia as long as the tube, racemes ½–1½ in. slender erect, bracts glabrous strongly often squarrosely ciliate, perianth eglandular, stamens 5–8, nut trigonous polished. *Meissn. in DC. Prodr.* xiv. 1. 110. P. flaccidum, *Roxb. Fl. Ind.* ii. 291 (*not of Meissn. or Boiss.*). P. mite ?, *Wall. Cat.* 1721 E, G, 1721/a *in part.* P. Rapte, *Herb. Ham.*

Plains and low hills of N. INDIA, from ASSAM and BENGAL to the INDUS, ascending to 4000 ft.; in the HIMALAYA, from Kumaon westwards.—DISTRIB. W. Asia, S. Europe, all Africa, America, Australia.

Habit between small states of *P. barbatum* and *P. minus*, of which latter this is probably a form with stouter racemes and more ciliate bracts and stipules. Specimens with leaves rounded or cordate at the base are distinct enough from both. Boissier describes it as perennial with rosy flowers, but the Indian plant is an annual with white flowers. Meissner and Boissier could not have attended to Roxburgh's description of his *P. flaccidum* (leaves cordate at the base), or they would have identified that plant with this; Roxburgh's figure of this (under the name of *P. flaccidum*) represents the leaves as much broader and more cordate at the base than I have ever seen them to be. A remarkable state from Dufla in Bhotan, collected by Booth, has the under surface of the leaves studded with a yellow secretion in minute dots.

Var. *Donii*; tall, slender, leaves petioled elliptic or lanceolate acuminate at both ends sparsely hairy beneath, racemes long slender erect, bracts close imbricate with one far removed and low on the slender peduncle, cilia as long as the tube. P. Donii, *Meissn. Monog. Polyg.* 72, *excl. syn.*, and in *DC. Prodr.* xiv. 1. 105, *excl. cit. of Wight.*—Nepal, *Wallich.*

There are two sheets of this in the Hookerian Herbarium (from Wallich, 1821), one with the narrow leaves described by Meissner, the other with much broader elliptic ones. They closely resemble *P. flaccidum* var. *hispida*, but the closer bracts with long spreading cilia and eglandular perianth distinguish it. From *P. Posumbu* most of the same characters separate it, but it is in many respects intermediate between these two.

35. **P. Posumbu,** *Ham. in Don Prodr.* 71 (*not of Wallich*); flaccid, very slender, stem extensively creeping below and peduncles quite glabrous, leaves 1–3 in. petioled elliptic-lanceolate caudate-acuminate glabrous or sparsely hairy, stipules sparingly strigose, cilia stiff longer than the tube, peduncles and erect racemes filiform sometimes very long, bracts minute close or distant very shortly ciliate, perianth very small eglandular, nut perfectly smooth and polished. *Meissn. in DC. Prodr.* xiv. 1. 105, *in part*; *Miquel Fl. Ind. Bat.* i. 1000. P. Donii, *Wall. Cat.* 1723 B. P. cæspitosum, *Blume Bijd.* 532 (*of Herb. Lugd. Bat.*). P. gracile, *Herb. Ham.*

TEMPERATE and SUBTROPICAL HIMALAYA; from Sikkim to Nepal. ASSAM, SILHET, CACHAR and the KHASIA MTS., ascending to 5000 ft.—DISTRIB. Munnipore, Java, China and Japan.

Stem creeping for 1–3 ft., then ascending or decumbent for 12–18 in., simple or branched. *Leaves* very membranous, ciliolate; petiole sometimes ¼ in. *Racemes* 1–3 in., always erect, very variable in length, sometimes almost capillary and 5 in. long with distant bracts, at others short with imbricate upper bracts and remote lower ones (these resembling small specimens of *serrulatum*). *Nut* 3-gonous, very small.—There are no Nepal specimens of this in Hamilton's or Wallich's Herbaria. Hamilton's are from Goalpara in Assam, and are not ticketed *P. Posumbu*, which name nowhere appears in his collection. Meissner's *α tenerum* is the right plant; his *β firmum* is composed of this and of *P. flaccidum*; his *γ macrophyllum* is *P. flaccidum*; his *δ ? cæspitosum* is right; his *ε ? ovatum* would appear to be *Ceratogo* *non atriplicifolium*, both from the number of Wallich's, which he quotes (1719), and from the length of the petiole (6–8 lines).—Don's publication of *Posumbu* and Blume's of *cæspitosum* are contemporaneous.

36. **P. Hydropiper,** *Linn.*; *Boiss. Fl. Orient.* iv. 1029; glabrous, rather robust, stem erect or ascending branched, leaves subsessile or petioled lanceolate or oblong-lanceolate glabrous or with the costa scabrid beneath, stipules glabrous or sparsely strigose very shortly ciliate, racemes filiform decurved interrupted, bracts glabrous glandular or not mouth naked or minutely ciliate, perianth very glandular pink, nut usually trigonous opaque granulate. *Meissn. in DC. Prodr.* xiv. 1. 109; *Fl. Dan.* t. 1376; *Reichb. Ic. Crit.* v. t. 494. P. mite, *Wall. Cat.* 1721 F, H.

Plains and hills of INDIA, in wet places, from ASSAM, SILHET, CHITTAGONG and BENGAL to N.W. INDIA; ascending the KHASIA MTS. to 5000 ft., and the HIMALAYA to 7000 ft. MADRAS (coll. *G. Thomson*).—DISTRIB. Westward to Europe and N. Africa, Temperate and Subtropical Asia, Java, N. America, Australia.

Annual, roots tufted or shortly creeping; stems and branches rather stout, leafy, 12–18 in. high, always glabrous, often glandular, nodes often swollen. *Leaves* rarely more than 3 in. long, very variable in width and in the length of the apex, usually covered with impressed glands; stipules glabrous, or with scattered erect appressed hairs that are sunk in the tissue of the stipule. *Racemes* flexuous, leafy at the base; bracts variable as to ciliation, which is always short, usually broader than in *P. flaccidum*; perianth pinkish. *Nut* sometimes flat, finely granular.—I cannot distinguish this from the European *P. Hydropiper*, though the cilia of the stipules are often longer and the nut smaller. Hamilton in a note upon his specimen (under the name of *flaccidum*), says that Roxburgh desired that it should bear the name of *Pani-maricha*, i.e. water-pepper. The Eastern specimens have more commonly a scabrid costa (which, however, varies in amount to total absence), and have more often sunk hairs in the stipules. I find these latter in European specimens; in which also I find occasional cilia on the bracts, but never a scabrid costa to the leaf. It is the *P. barbatum* of Roxb., according to a specimen in Herb. Wallich, but not of the "Flora Indica." Zollinger's No. 95 from Java is identical with the Indian plant. The long cilia of the more glabrous stipules, shorter racemes and more crowded flowers distinguish this from *P. flaccidum*.

Var. ? *eglandulosa*; perianth eglandular, nut compressed.—Western Himalaya, *Edgeworth*; Kunawur, Jamu and Ladak, *Thomson*.—But for the more drooping racemes and smaller pink flowers this would be *P. mite*, L., to which I was inclined to refer it, but Mr. Baker regards it as a form of *Hydropiper*.

37. **P. flaccidum,** *Meissn. in DC. Prodr.* xiv. 1. 107, *in part, excl. syn.* (*not of Roxburgh*); glabrous or pubescent, stem erect or ascending simple or branched, leaves usually petioled lanceolate or elliptic-lanceolate acuminate, stipules strigose or hirsute, cilia half as long as the tube or longer, racemes very long filiform decurved, bracts usually very distant glabrous glandular, mouth ciliate, nut trigonous rarely compressed opaque granulate. *Boiss. Fl. Orient.* iv. 1029, *excl. syn. Donii.* P. barbatum, *Roxb. Fl. Ind.* ii. 289 (*not of Willd.*). P. Posumbu, *Thwaites Enum.* 245. ? P. tenellum, *Roxb. Fl. Ind.* ii. 289. P. Donii, *Wight Ic.* t. 1801. P. mite ?, *Wall. Cat.* 1721/2, 3, D, 1723/1 b, C. P. Rottleri, *Roth Nov. Pl. Sp.* 205. P. rivulare, *Herb. Helf.* (*ex Meissn.*). P. asperulum, *Wall. mss.* P. Bisculatium, *Herb. Ham.* P. ciliatum, *Ic. Roxb.*

Common throughout INDIA in wet places, ascending the Himalaya to 4000 ft., and extending to CEYLON and MALACCA.—DISTRIB. Malay Archipelago.

Usually a much taller, longer and larger leaved species than *P. Hydropiper*, and differing in other characters indicated under that plant.

Root perennial ?, shortly creeping; stems 2–3 ft., usually erect and slender glabrous or strigose. *Leaves* 2–6 in., glabrous altogether or with the exception of the costa and nerves beneath, or hispidly or strigosely hairy on the surfaces or below only, brown when dry, more or less glandular. *Stipules* usually very strigose with stiff appressed hairs, cilia often as long as the tube. *Racemes* subpaniculate, sometimes 6 in. long and extremely slender; bracts glabrous, more or less ciliate, glandular or not; perianth bright pink, very thickly glandular. *Stamens* 8. *Nut* small, black, minutely granular.—The taller, longer-leaved, hairy forms of this are very distinct from *P. Hydropiper*, but amongst a large suite of specimens of both, some occur that it is difficult to refer to one rather than to the other. As pointed out under *P. serrulatum*, Roxburgh's *P. flaccidum* is that plant. This obliges me to retain the name (*flaccidum*) as Meissner's, though in so doing I am unable to take in his synonymy and his varieties, which are much confused. Boissier gives Affghanistan Griffith as a locality for this species, but I have seen no specimens, and his description quite agrees with the Indian plant. I can hardly doubt this being Roth's *P. Rottleri*, which he received from Heyne (under the name of *P. barbatum*, Rottler), but am puzzled by his description of "style quite simple and stigma capitate"—in allied species he always speaks of stigmas. I do not see how glabrous forms differ from the American *P. acre*, HBk., except, as Meissner observes (in Fl. Bras.), by the granulate (not smooth polished) nut.

Var. *hispida*; leaves elliptic ovate much smaller 1–1½ in. long, hirsute beneath or on both surfaces, glands of perianth less strong. P. hispidum, *Ham. in Don Prodr.* 71, *not of Meissn. or Bab.* P. Pósumbu, *Meissn. in DC. l. c.* 105, *in part.* P. Hamiltonii, *Spreng. Syst. Veg., Cur. post.* 155 (*not of Meissn.*). P. Babingtoni, *Endl. Gen. Pl. Suppl.* iv. 47, *excl. syn. Bab.* P. mite, *Wall. Cat.* 1723, 1 a, *in part.*—Nepal, *Hamilton*; Kumaon, at Naini tal, alt. 6400 ft., *Strach. & Winterb.* (No. 17); Hawalbagh, *Thomson.*—A specimen in Wallich's Herbarium of Hamilton's *P. hispidum* shows that this plant has been misunderstood first by Babington, who described for it a variety of *P. barbatum*, or *P. Bishiræ*, followed by Meissner (in De Candolle), who did the same, adopting the name of *Hamiltonii*, which had been proposed for it by Sprengel (there being an earlier *P. hispidum*); and lastly by Endlicher, who included both Hamilton's and Babington's plants under the third name of *P. Babingtoni.* Beyond this I have been unable to unravel completely the synonymy of this obscure plant, which differs from *P. flaccidum* in its much shorter leaves and less glandular perianth. It resembles *P. serrulatum* var. *Donii*, which differs in the coarse strong cilia of the bracts.

38. **P. macranthum,** *Meissn. in DC. Prodr.* xiv. 1. 207; tall, erect, stem glabrous or sparsely strigose, leaves 3–6 in. petioled elliptic-lanceolate acuminate glabrous or sparsely hispid beneath, stipules substrigose, cilia as long as the tube, racemes long narrow erect strict, bracts closely imbricate with one or two removed far below glabrous shortly ciliate eglandular, perianth very large, nut large polished. Polygonum, No. 21, *Herb. Ind. Or. H. f. & T.*

ASSAM, *Wallich, Griffith, &c.* SILHET, the JHEELS and KHASIA MTS., ascending to 5000 ft., *J. D. H. & T. T., Clarke.*

Habit and size of *P. flaccidum*, but at once distinguished by the strict rarely flexuous (never decurved) racemes 3–6 in. long, with closely imbricating bracts and the polished nut.—I have seen but two flowering specimens, in which the perianth is nearly ¼ in. diam.; and from the small size of the buds in numerous other specimens I suspect that the perianth may vary much in size. The nut is nearly ⅙ in. long, jet-black, quite smooth, shining with obtuse angles.

Sect. VIII. CEPHALOPHILON, *Meissn.*; erect or prostrate unarmed annuals, rarely perennial-rooted, or shrubs. *Leaves* usually broad entire or runcinately lobed or auricled; stipules short, tubular. *Flowers* in single or corymbose heads (spikes in *P. muricatum*); bracts flat, hardly tubular. *Perianth* 4–5-lobed or -partite. *Stamens* 6–8, glands 0 or obscure. *Styles* 2–3, filiform, connate below or throughout, stigmas capitate. *Nut* trigonous or biconvex, enclosed in or adnate to the often enlarged and sometimes fleshy perianth-tube; cotyledons accumbent.

39. **P. humile,** *Meissn. in Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 128; small, sparsely glandular-hairy, stem filiform, leaves ⅓ in. subsessile ovate acute or rhombic-ovate, mouth of stipules very oblique, heads long peduncled small, bracts very small ovate-lanceolate acute, stamens 5–6, nut biconvex striate and punctate. P. perforatum, *Wall. Cat.* 1700, *in part.*

TEMPERATE and ALPINE HIMALAYA; Kunawur, *Grant*; Kumaon, alt. 8500 ft., *Strachey & Winterbottom*; Nepal, *Wallich*; Sikkim, alt. 7–11,000 ft.; *J. D. H.*, *Clarke.*

Annual. *Stem* 4–6 in., simple and erect or diffusely branched from the base. *Leaves* very uniform, epunctate, sometimes narrowed into a short broad petiole. *Heads* ¼ in. diam., on long slender pedicels, without an involucral leaf; bracts longer than the flowers. *Perianth* greenish, tube closely investing but not cohering with the nut, eglandular; lobes very short, rounded. *Nut* black, coarsely punctate; styles slender, connate below, stigmas capitate.

40. **P. glaciale,** *Hook. f.*; dwarf, flaccid, glabrous, subsucculent, leaves long-petioled broadly ovate obtuse, heads small sessile or peduncled, peduncle minutely glandular at the tip, bracts broadly ovate obtuse glabrous about equalling the 3-gonous nut. P. perforatum γ. glaciale, *Meissn. in DC. Prodr.* xiv. 1. 128. P. perforatum, *Aitchison in Journ. Linn. Soc.* xviii. 90.

ALPINE and SUBALPINE HIMALAYA; Kashmir, alt. 8400–12,000 ft., *Clarke*; Kunawur and Piti, alt. 9000–11,000 ft., *Thomson*; Kumaon, alt. 13,000 ft., *Strachey & Winterbottom*, &c.—DISTRIB. Affghanistan.

Annual, 2–4 in. high, branched from the root, branches diffuse. *Leaves* ⅓–¾ in., nerves indistinct, surfaces minutely granular when dry; petiole as long as the blade, winged above only; stipules short, cupular, simple or 2-lobed, glabrous. *Heads* ⅙–¼ in. diam., without an involucral leaf. *Perianth* hyaline; lobes subequal, obtuse. *Stamens* 5. *Nut* minute, closely invested by the perianth-tube, black, striolate and punctate.—The long petioles at once distinguish this from *P. alatum.*

41. **P. alatum,** *Ham. mss.*; *Spreng. Syst. Veg., Cur. post.* 154; tall, erect or low and procumbent, glabrous or sparsely hairy, leaves large or small ovate or deltoid-ovate obtuse or acute narrowed into a broadly winged often amplexicaul petiole glandular or not, stipules tubular obliquely truncate, peduncles glandular hispid at the tip, heads usually with an involucral leaf, bracts ovate-lanceolate glabrous not ciliate, perianth 1–5-fid., stamens 7–8, nut biconvex or trigonous striate and punctate. P. punctatum, *Ham. in Don Prodr.* 72; *Bab. in Trans. Linn. Soc.* xviii. 105. P. perforatum, *Meissn. Monogr. Polyg.* 83, and in *Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 128, *excl.* γ. *glaciale*; *Wall. Cat.* 1700. P. nepalense, *Meissn. Monog.* 84, *in Wall. Pl. As. Rar.*, and in *DC. ll. c.*; *Fresen. in Mus. Senkenb.* iii. 64; *Bab. l. c.* 106; *Wight Ic.* t. 1804.

Throughout the HIMALAYA; abundant at 4–10,000 ft. elevation, from Sikkim to Kashmir. KHASIA MTS., alt. 4–6000 ft. NILGHIRI MTS. (a weed in gardens), *Wight.* CANARA; Bababudan Hills, *Heyne.* CEYLON, abundant.—DISTRIB. Affghanistan, Java, Japan, Abyssinia.

Annual. *Stem* rarely creeping for a short distance at the base, erect and subsimple or branched from the base; branches 6-18 in. high, slender or rather stout, flaccid or stiff, erect ascending or prostrate, glabrous or sparsely grandular-hairy. *Leaves* in the largest specimens 2–3 in. long, and the smallest ¼ in., base sometimes subcordate, suddenly contracted into the broadly-winged petiole which is often auricled at the base; stipules glabrous or hairy, sometimes glandular, rarely ciliate. *Heads* ¼–¾ in. diam.; peduncles short or long, always glandular-hairy above; involucral leaf often longer than the head, sessile, ovate-cordate, obtuse or acute. *Sepals* white or pale purple, membranous, subequal, very variable in size. *Stamens* included. *Style* long with one or two long arms and capitate stigmas. *Nut* varying in size in the same head, closely invested with and cohering with the thin perianth-tube and crowned with its lobes.—I fail to discriminate between Meissner's *P. perforatum* and *P. nepalense*, and I have taken for both Hamilton's name of *alatum* as adopted by Sprengel for his *punctatum*. The absolute character whereby these supposed species were distinguished, that of the biconvex and trigonous nut, is accompanied by no other, and I have taken typical nuts of both forms from one head of a Nilghiri specimen. Meissner himself observes that his *nepalense* has sometimes trigonous nuts. The character of glandular leaves again is most variable, and eglandular specimens are far the most abundant. Of the following forms some may prove to belong to distinct species, but I doubt it.

P. alatum proper; stems 1–2 ft., leaves large glandular or not, heads large, invol. leaf large, bracts obtuse or subacute, nut trigonous. P. alatum, *Spreng. l. c.* P. punctatum, *Ham. mss.*—Abundant.

Var. *nepalense*; stems 1–2 ft., leaves large glandular or not, heads large, invol. leaf large, bracts obtuse or subacute, nut biconvex. P. nepalense, *Meissn. Monog. l. c.* t. 7, f. 2; *Wall. Cat. l. c.* P. guttuliferum, *Miq. Pl. Hohenack.*, No. 968 (*leaves glandular*).—Abundant.

Var. *parviflora*; stem 1–2 ft. slender, leaves about 1 in., heads small on more slender peduncles, bracts acute, lower recurved, nut trigonous. P. perforatum, *Meissn. l. c. excl.* γ.; *Wall. Cat.* 1700.—Common, also in Ceylon (nuts flat).

Var. *arenaria*; smaller, diffusely branched, stem elongate prostrate with ascending flowering branches, leaves ½–1 in. narrower eglandular, petiole shorter, heads large, invol. leaf very small, bracts obtuse, fruiting perianth with a median rib on each face, nut biconvex.—Sikkim, sands of the River Rungeet, &c., *Clarke*, *Treutler*.

Var. *Metziana*; small, diffusely branched from the base, branches very slender prostrate and ascending, leaves broad ½–1 in. long glandular or not, petiole short, heads small, peduncles very slender, invol. leaf large or small, bracts acute, nut trigonous or biconvex. P. Metzianum, *Miq. in Herb. Hohenack.*, No. 610.—Specimens with 3-gonous nuts are from Sikkim and the Khasia Mts., at 5000 ft.; Kumaon and Dalhousie, 7000 ft.; and with flat nuts from Parusnath, the Khasia Mts., Canara, the Nilghiri Mts. and Ceylon, all at above 4000 ft.

Var. *rigidula*; dwarf, nearly glabrous, stem 2–3 in. strict erect subsimple or dichotomously branched, leaves ¼–½ in. acute eglandular, petiole short, heads small (large for the size of the plant), invol. leaf large or small, bracts acute or acuminate, flowers purple-red, nut biconvex.—Kunawur, *Grant*; Sikkim, alt. 7300 ft., *Clarke*.—Very like small specimens of *P. humile*.

Var. *tenuicaulis*; very slender, diffusely branched, quite glabrous except the tips of the peduncles, leaves ½–¾ in. very narrow acuminate glandular, heads very small, peduncles capillary, bracts acuminate recurved, nut trigonous.—Khasia Mts., alt. 4–5000 ft., *J. D. H. & T. T.*, *Clarke*.

42. **P. microcephalum,** *Don Prodr.* 72; glabrous or sparsely hairy, stem rigid tall erect or decumbent below angled and grooved, leaves 3–5 in. hastately ovate-lanceolate or -oblong acuminate abruptly narrowed into the long winged petiole, stipules truncate often ciliate, heads small, peduncle filiform quite glabrous, involucral leaf 0, bracts oblong obtuse more or less ciliate, nut 3-gonous granulate. *Meissn. Monog. Polyg.* 82, in *Wall. Pl. As. Rar.* iii. 59, and in *DC. Prodr.* xiv. 1. 129. P. staticiflorum, *Wall. Cat.* 1704, *excl.* D. P. strigosum, *Herb. Ham.*; *Wall. Cat.* 1732, *under P. Wallichii.* ? P. ciliatum, *Ham. in Don Prodr.* 73.

TEMPERATE HIMALAYA; Nepal, *Wallich*; SIKKIM, alt. 4–5000 ft., *J. D. H.* KHASIA MTS. and SILHET, alt. 0–4000 ft.

Root slender, perennial, woody; stem 2–3 ft., often decumbent and rooting below at the nodes, glabrous or subhispid above. *Leaves* membranous, eglandular, ciliate, with the petiole sometimes auricled at the base, uppermost sessile and deeply amplexicaul. *Peduncles* axillary and subterminal, often forked; heads ¼–⅓ in. diam.; perianth white, 5-cleft. *Stamens* 8. *Styles* 2–3, slender, connate below, stigma capitate.—It is curious that of 60 specimens examined not one bears ripe fruit. Meissner and Clarke (mss.) describe it as 3-gonous, but I find both digynous and trigynous flowers. Meissner's var. *β. subvillosa* is a hirsute leaved state. Hamilton's *P. ciliatum* is a very doubtful plant; according to Don's description it differs from *P. microcephalum* only in the decumbent stem. Meissner describes the peduncles as sometimes hispidulous, but I never find them so.

43. **P. Wallichii,** *Meissn. Monogr. Polyg.* 83, t. 7, f. 1, *in Wall. Pl. As. Rar.* iii. 60, and in *DC. Prodr.* xiv. 1. 129; glabrous, stem slender decumbent, branches ascending, leaves 1–2 in. ovate-cordate acuminate ciliolate, petiole not winged auricled at the base, stipules ciliolate, heads small, peduncles subterminal short very slender quite glabrous, involucral leaf 0 or small, bracts broadly oblong obtuse eciliate. *Wall. Cat.* 1702, *excl. cit. of Wight.*

TEMPERATE HIMALAYA; Nepal, *Wallich, Scully*; Sikkim, alt. 4000 ft., *Clarke.*

Root perennial, creeping. *Stems* 2–3 ft., flexuous, stout, angled and grooved, prostrate but not rooting. *Leaves* 1–2 in., rather abruptly acuminate, uppermost cordate amplexicaul, auricles minute green; stipules long, loose, glabrous or hairy. *Peduncles* subterminal; heads as in *P. microcephalum,* but bracts not ciliate. *Perianth* 5-fid. *Stamens* 6–8. *Nut* trigonous.—I have seen only a few specimens. The habit, and naked petioles with minute basal auricles and eciliate bracts distinguish this from *P. microcephalum.* Meissner is in error in citing Wight's t. 1805 for this; it is clearly *P. sphærocephalum.*

44. **P. sphærocephalum,** *Wall. Cat.* 1703; rarely glabrous, stem very long slender creeping, branches short erect, leaves 1–3 in. ovate- or oblong-cordate acuminate ciliolate, petiole not winged nor auricled, stipules truncate mouth naked, peduncles glandular-hairy terminal and axillary, involucral leaf 0, bracts ovate-oblong acute eciliate. *Meissn. in Wall. Pl. As. Rar.* iii. 60; *Bab. in Trans. Linn. Soc.* xviii. 107; *Gærcke in Bot. Reise Pr. Waldem.* 136. P. Wallichii, *Wight Ic.* t. 1805. P. podocephalum, *Klotzsch in Bot. Reise Pr. Waldem.* t. 86.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Kumaon, alt. 6–8000 ft., *Royle,* &c. NILGHIRI MTS., *Wight.*

Perennial? *Stems* 2–3 ft. long, rooting at the nodes, angular and grooved; branches erect from the nodes, 2–4 in. high, with 2–3 long-petioled leaves terminating in a solitary 1-headed peduncle. *Leaves* 1–3 in., eglandular, sparsely hairy or glabrous; petiole ½ to 1 in., winged at the top only. *Heads* ½ in. diam.; flowers longer than the bracts, rose-cold. *Nut* flat or 3-gonous.—A specimen in Wight's Herbarium has much larger leaves (3–3½ by 2 in.), with petioles winged to near the base; it is marked *P. Wallichii*? and is the only one seen of the Nilgiri plant figured by Wight. In the plate he correctly figures the peduncles as hairy, and the stipules as eciliate, but he describes the former as glabrous, and the latter as shortly ciliate. He has, I suppose, figured *sphærocephalum* from native specimens, and copied Meissner's description of *P. Wallichii.*

45. **P. runcinatum,** *Ham. in Don Prodr.* 73; stem ascending from a creeping base smooth scabrid or hairy, leaves runcinate-pinnatifid glabrous terminal lobe triangular-ovate acuminate, petiole short with amplexicaul auricles, peduncles glandular-hispid above, heads large, involucral leaf 0, bracts oblong eciliate, nut minute globosely 3-gonous. *Meissn. Monog. Polyg.* 85, *in Wall. Pl. As. Rar.* iii. 60, and in *DC. Prodr.* xiv. 1. 130; *Wall. Cat.* 1698. P. reticulatum, *De Bruyn. in Pl. Jungh.* 300.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton, Wallich*; Sikkim, alt.

7–10,000 ft., *J. D. H.*, &c. KHASIA MTS., alt. 4–5000 ft., *Lobb*, *J. D. H.* *&* *T. T.*, &c.—DISTRIB. Java.

Annual. *Stems* 10–18 in., slender, flaccid, grooved and angled, strict or flexuous, simple or branched. *Leaves* 1½–6 in., membranous, ciliolate, glabrous or sparsely hairy, uppermost simple and cordate-amplexicaul; lateral lobes 1–3 pairs horizontally spreading, rounded or oblong; auricles very variable, sometimes in mere green rings, at others nearly 1 in. diam.; stipules short, hairy and ciliate. *Peduncles* slender. *Heads* ⅓–¾ in. diam.; flowers white or pink. *Perianth* 5-cleft. *Stamens* 7–8. *Styles* 3, slender, connate below. *Nut* opaque.—The var. *β. javanicum* has much larger more ovate trigonous nuts.—Extensively cultivated in Sikkim.

46. **P. sinuatum,** *Royle mss.*; *Meissn. in DC. Prodr.* xiv. 1. 130; glabrous, stem creeping with short erect leafy branches, leaves runcinate-pinnatifid, terminal lobe rhomboid acute, petiole short with amplexicaul auricles, peduncles glabrous axillary, heads solitary, involucral leaf 0, bracts ovate obtuse, nut minute globosely trigonous.

WESTERN HIMALAYA; Kumaon, *Royle*, alt. 9000 ft., *Strachey* *&* *Winterbottom*; Garwhal, *Falconer*; Kulu, alt. 8–10,500 ft., *Stewart.*

Perhaps, as Meissner suggests, a variety of *P. runcinatum*, but creeping, much smaller in all its parts, and quite glabrous except occasionally the stipules, leaves ½–1 in., terminal lobe much smaller in proportion to the lateral and of a very different shape, sometimes almost transversely oblong and apiculate. The nut is the same in both.

47. **P. capitatum,** *Ham. in Don Prodr.* 73; stems or branches many stout creeping from a woody rootstock leafy, and stipules glandular-hirsute, leaves ½–1½ in. shortly petioled elliptic acute, petiole 2-auricled at the base, stipules short cupular, heads 1–3, peduncles glabrous or glandular-hispid, involucral leaf 0, bracts ovate acute eciliate. *Meissn. Monog. Polyg.* 82, and in *DC. Prodr.* xiv. 1. 129; *Bab. in Trans. Linn. Soc.* xviii. 107. P. repens, *Wall. Cat.* 1699; *Meissn. in Wall. Pl. As. Rar.* iii. 60.

SUBTROPICAL and TEMPERATE HIMALAYA; on rocks, walls, &c., alt. 4–6000 ft. from Chamba to Bhotan. KHASIA MTS., alt. 3–5000 ft.

Perennial; rootstock stout, twisted; stems or branches 6–10 in. long, trailing and rooting below, red-brown; hairs brown. *Leaves* crowded, bifarious, rather thick, brownish when dry, eglandular, base sometimes cordate; petiole ⅛–⅙ in., auricle small rounded. *Heads* ¼–⅓ in. diam., dense-fld., glandular and hairy; bracts glabrous *Perianth* pink, 5-cleft; segments obtuse. *Stamens* 8. *Nut* 3-gonous, very small, 1/12 in., much smaller in proportion to the perianth than in its allies.—Meissner's var *macilentum* appears to have no definite character.

48. **P. chinense,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 130; shrubby glabrous or sparsely pubescent or glandular-pubescent, leaves petioled 3–5 in from linear-oblong to oblong- or deltoid-ovate or -rotundate entire or crenulate, base truncate rounded acute or subcordate uppermost cordat amplexicaul, petiole hardly winged usually 2-auricled at the base, stipule long very obliquely truncate acute, heads panicled or corymbose, peduncle usually glandular-hairy, involucral leaf 0, bracts glabrous usually acute fruiting perianth dry or fleshy, nut trigonous. *Meissn. Monog.* 60, and i *Wall. Pl. As. Rar.* iii. 60; *Bab. in Trans. Linn. Soc.* xviii. 109; *Roxb. Fl Ind.* ii. 289; *Wight Ic.* t. 1806; *Grah. Cat. Bomb. Pl.* 172; *Dalz.* *&* *Gib Bomb. Fl.* 214. P. cymosum, *Roxb. l. c.* P. auriculatum, *Meissn. Monog* 39, t. 6, and in *Wall. Cat.* 1705. P. polycephalum, *Wall. Cat.* 1707. P. bra chiatum, *Poir. Dict.* iv. 15; *Lamk. Ill.* 315, t. 4; *Wall. Cat.* 1706. P patens, *Don Prodr.* 73; *Meissn. Monog.* 60. P. corymbosum, *Willd. Sp. Pl* ii. 452. P. ovatum, *Heyne in Roth Nov. Sp.* 206. P. adenotrichum, *Wall*

mss. Ampelygonum chinense, *Lindl. in Bot. Reg.* 1838; *Misc.* 63, No. 118. P. panduræforme, *Ham. mss.*; *Wall. Cat.* 1704 D. Coccoloba crispata, *Ham. in Roxb. Fl. Ind.* ii. 292.

SUBTROPICAL and TEMPERATE HIMALAYA; from Simla to Bhotan, alt. 4–8000 ft. ASSAM, the KHASIA MTS., SILHET, CACHAR, CHITTAGONG, RANGOON and BURMA to MALACCA. BEHAR, top of Parusnath, alt. 4000 ft. DECCAN PENINSULA; on the Western Ghats from the Concan southward. CEYLON, abundant.—DISTRIB. Sumatra, Java, Philippine Islands, China and Japan.

A rambling or erect shrub, reaching 5 ft.; stems and branches many from the root, stout, flexuous, angled and grooved. *Leaves* extremely variable, rarely orbicular; gland-dotted or not, rigid or membranous, flat or undulate; petiole short, winged above, auricles extremely variable, deciduous usually rounded, sometimes ½ in. broad, at others suppressed; stipules often ¾ in. long with long waving points. *Heads* very variable in number, ¼–⅓ in. diam.; peduncles divaricate; flowers white, pink or purplish. *Perianth* 5-cleft. *Stamens* 8. *Styles* 3, connate below. *Nuts* variable in size, enclosed in the dry or fleshy perianth.—A polymorphous plant, of which the following forms may show the extent of variation, but are not approximately constant, nor do they comprise all the departures from any assumed type that could be defined by words, which would be a very great many. I cannot conceive what other *Polygonum* than this Roth describes as *P. ovatum.*

P. chinense proper; leaves ovate-oblong or deltoid-ovate base truncate or subcordate, peduncles eglandular.—Var. Thunbergianum, *Meissn. in Wall. Pl. As. Rar.* iii. 60, and in *DC. l. c.*

Var. *ovalifolia*, Meissn. l. c.; leaves ovate or oblong-ovate acute at both ends often crenulate glabrous, peduncles glandular-hispid, heads large or small.—Himalaya, Parusnath, common in the Deccan Mts., Ceylon, &c.

Var. *subhastata*, Meissn. l. c.; leaves oblong or lanceolate base cordate or subhastate sometimes very long, peduncles eglandular, heads small.

Var. *corymbosa*, Meissn. l. c.; leaves oblong-lanceolate base acute or acuminate, peduncles eglandular, heads large.

Var. ? *parvifolia*; stem slender prostrate, leaves 1½–2 in. hastate oblong, petiole not auricled, bracts obtuse or subacute.—Silhet, *Wallich*; Assam, *Jenkins*.—This may be a different species; the habit is that of *P. Wallichii*, but the leaves are not ciliolate.

Var. *hispida*; branches leaves on both surfaces and inflorescence hispidly hairy, hairs on the branches reflexed.—Tenasserim, *Gallatly* (*in Herb. Calcutt.*).

Sect. IX. ECHINOCAULON, *Meissn.* Erect prostrate or subscandent often prickly herbs. *Leaves* usually broad, often cordate or hastate; stipules tubular. *Flowers* in simple or panicled heads or spikes; bracts usually shortly tubular, ciliate. *Perianth* 5-lobed. *Stamens* 5–8, with alternating glands. *Styles* 2–3, free, stigmas capitate. *Nut* free, trigonous or biconvex; cotyledons accumbent.

* *Nut exserted.*

49. **P. muricatum,** *Meissn. Monog. Polyg.* 74, *in Wall. Pl. As. Rar.* iii. 58, and in *DC. Prodr.* xiv. 1. 133 (*not of Wall. Cat.*); stem very long and slender flaccid smooth or angles sparsely scabrid, leaves distant lower petioled ovate or oblong-ovate acute or obtuse, base rounded truncate or cordate upper amplexicaul-cordate, stipules glabrous ciliate, heads laxly panicled, peduncles glandular-hispid or glabrous, spikes few-fld. P. asperulum, *Wall. Cat.* 1724. Polyg. pedunculare *var.* and Polyg. n. 57, *Herb. Ind. Or. H. f. & T.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 10–12,000ft., *J. D. H.* KHASIA MTS., alt. 4–5000 ft., *J. D. H. & T. T.*, *Clarke.*

Perennial?. *Stems* creeping and often tufted at the base, above rambling over bushes, sometimes quite smooth even at the nodes. *Leaves* 1–2 in., membranous, sometimes sparsely hairy beneath, ciliolate or not, midrib beneath smooth or scabrid; petiole very slender, smooth or scabrid; stipules truncate, base naked or with a ring of reversed prickles. *Spikes* ⅛–1 in. long, on almost capillary peduncles; flowers distant in Himalayan specimens, closer in Khasian; bracts ovate or lanceolate, hispid and ciliate or glabrate. *Perianth* white or pink. *Stamens* 5 or 6. *Styles* very slender, connate below. *Nut* ovoid, with acute angles, pale, smooth, shining.—Wallich's Nepal specimens have the spikes and bracts densely glandular-pubescent or glabrate, and partially exserted nuts. Sikkim ones have perfectly smooth and glabrous stems, stipules, spikes and bracts, eciliate stipules, and smaller flowers with subacute sepals much shorter than the nut; they may form a different species. Khasian ones have subcapitate densely glandular-pubescent spikes, and nuts closely wrapped in the perianth, the segments of which are obtuse as in the Nepal specimens.

50. **P. arifolium,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 134; stem very slender flaccid smooth or angles retrorsely scabrid, leaves long-petioled broadly hastate acuminate basal lobes spreading acute, stipules very short hispid and ciliolate, peduncles glandular-hispid, heads small few-fld., involucral leaves 1–2 linear, bracts small hispid, nuts broadly trigonous exserted. Polyg. n. 53, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Dikeeling, alt. 7000 ft., *Clarke.* KHASIA MTS., in woods, alt. 5000 ft., *J. D. H. & T. T.*—DISTRIB. N. America.

Stems 2–3 ft., weak. *Leaves* 2–3 in., membranous, ciliolate, glabrous, or sparsely setose on the nerves beneath and on one or both surfaces, base truncate; petiole nearly as long as the blade, very slender, smooth or scabrid; stipules ¼ in. long, lax, base naked or with a few retrorse hairs. *Heads* small, very few-fld., on strict forked peduncles, usually subtended by one or two narrow spreading ciliate invol. leaves; bracts very small, lanceolate, acute, ciliate; flowers small. *Perianth* 5-cleft. *Stamens* 5. *Styles* very slender, connate below. *Nut* ovoid, acutely 3-gonous, acute, pale, shining.—This is a slender form of the American plant, quite like some Pennsylvanian specimens. Flowers and ripe fruits are formed on short stolons from the creeping base of the stem.

** *Nut included in the perianth.*

51. **P. perfoliatum,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 132; stem rambling or climbing, flexuous angles and petioles with stout recurved prickles, leaves very long-petioled peltate deltoid angles obtuse or subacute, stipules foliaceous orbicular amplexicaul, peduncles smooth or sparingly prickly, racemes solitary short, bracts broad rounded glabrous, nut globose obscurely 3-gonous. *Roxb. Fl. Ind.* ii. 288; *Wall. Cat.* 1696; *Lamk. Ill.* t. 315, f. 3; *Burm. Fl. Ind.* 90, t. 31, f. 2. Echinocaulos perfoliatus, *Hassk. Cat. Hort. Bogor.* 85, and *Pl. Rar. Jav.* 220. Chilocalyx perfoliatus, *Hassk. in Flor. Bot. Zeit.* 1842, *Beibl.* ii. 20; *Miquel Fl. Ind. Bat.* i. 1013.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 4–5000 ft., *J. D. H.*; Bhotan, *Booth.* KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.* BENGAL, in the Jheels, &c. SILHET, *Wallich.* CACHAR, *Keenan.*—DISTRIB. Java, China, Japan.

Stem rambling for several feet. *Leaves* 2–5 in. long and broad, membranous, midrib and nerves beneath sometimes prickly; petiole slender, as long as the blade; stipules ½–1 in. diam. *Peduncles* very short; racemes ½–¾ in.; bracts membranous; flowers white or lilac, large for the genus. *Perianth-lobes* rounded. *Stamens* 8. *Styles* short, connate below. *Nut* large, black, apiculate, included in the often fleshy perianth. *Cotyledons* very large, radicle short inflexed accumbent.—Leaves acid, eaten in Cachar, *Keenan.*

52. **P. sagittatum,** *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 132; glabrous, stem suberect or prostrate angles petioles and midrib beneath covered more or less with recurved prickles, leaves petioled 1–2 in. linear-oblong obtuse or acute base sagittate, margins smooth, stipules very short glabrous, heads few small, involucral leaf 0, peduncles slender distantly muricate or smooth, bracts oblong obtuse glabrous, nut 3-gonous. P. muricatum, *Herb. Griff. Kew Distrib.* 4125. P. Sieboldii, *Meissn. l. c.* 133.

WESTERN HIMALAYA, *Falconer*; Kulu and Kumaon, alt. 7–8000 ft., *Edgeworth*; Lohoo Ghat, *Thomson*. EAST BENGAL, *Griffith*. KHASIA MTS., in marshes at Myrung, alt. 5000 ft., *J. D. H. & T. T.*—DISTRIB. Siberia, China, Japan, Eastern N. America.

Very similar to slender form of *P. strigosum*, but the leaves are shorter, more glaucous beneath, not truncate or cordate below, but with two long deflexed or incurved obtuse or acute auricles, and their margins are quite smooth.

53. **P. strigosum,** *Br. Prodr.* 420; stem 2–4 ft. suberect angles petioles and nerves of leaf beneath more or less covered with recurved prickles, leaves shortly petioled linear or linear-oblong acuminate or acute base truncate or shortly cordate, margin retrorsely prickly, racemes panicled oblong or subglobose, peduncles scabrid prickly or glandular-hispid, bracts ovate or oblong ciliate and strigose, nut globosely 3-gonous included in the perianth. *Meissn. in DC. Prodr.* xiv. 134. P. horridum, *Roxb. Cat.* 29, and *Fl. Ind.* ii. 291; *Meissn. in Wall. Pl. As. Rar.* iii. 58, and in *DC. l. c.* 133. P. muricatum, *Wall. Cat.* 1697 (*not of Meissn.*), *excl. var. glabrata*; *Miquel Fl. Ind. Bat.* i. 1011. P. sagittatum, *Don Prodr.* 73 (*not of Linn.*). P. sagittatum β. indicum, *Meissn. Monog. Polyg.* 65. P. hispidulum, *Blume Bijd.* 535. P. auriculatum, *Herb. Ind. Or. H. f. & T.*

TROPICAL HIMALAYA from Kulu to Bhotan, and the KHASIA MTS., ascending to 5000 ft., in watery places; and southward to the NILGHIRI MTS., CHITTAGONG and PENANG. CEYLON; alt. 5–6000 ft. (C. P. 3348).—DISTRIB. Ava, Malay Archipelago, China.

Stem 1–3 ft., often rather stout, very variable in amount of prickles. *Leaves* 1–5 in., rigid, glabrous or pubescent beneath, sometimes scabrid above, margin with rigid minute recurved prickles, midrib usually prickly; petiole ¼–½ in. or 0; stipules 1 in., ciliate, glabrous or hairy, base with usually a pectinate ring of reversed prickles. *Peduncles* slender; racemes ⅓–½ in., densely many- or few-fld.; flowers pink. *Perianth*-lobes obtuse. *Stamens* 6–8. *Styles* slender, connate below. *Nut* black, opaque, punctulate.—Meissner describes the nuts as sometimes biconvex; I find all the Northern Indian specimens to be trigynous, all the Peninsular digynous, which favours the view that this does not differ from *P. pedunculare*. Bentham indeed (Fl. Austral. v. 268) unites with this *P. pedunculare*, *P. glabratum*, and *P. muricatum*. For the first and second there is something to be said, but *P. muricatum* is an entirely different species. The American *P. Meissnerianum* differs from *P. strigosum* chiefly in the prickles not being recurved.

54. **P. prætermissum,** *Hook. f.*; small, glabrous, stem 6–8 in. ascending subsimple nearly or quite unarmed, leaves shortly petioled linear obtuse base sagittate with obtuse lobes, stipules glabrous eciliate with a few recurved bristles at the base, flowers very few and distant in forked or simple glabrous axillary racemes, bracts erect oblong glabrous or subciliate, nut globosely 3-gonous included in the perianth. P. strigosum, *Thwaites Enum.*, *in part*; *Benth. Fl. Austral.* v. 268, *in part*. P. muricatum, *var.* glabrata, *Wall. Cat.* 1697/3. P. muricatum, *Herb. Ind. Or. H. f. & T.*

SILHET, *Wallich*. KHASIA MTS., in watery places, alt. 4–5500 ft., *J. D. H. & T. T.*, *Clarke*. CEYLON, alt. 6–7000 ft., *Walker* (C. P. 2250).—DISTRIB. Tasmania.

Stem 4–18 in., creeping and rooting at the base, quite smooth except rarely a few deflexed prickles beneath the nodes. *Leaves* 1–2 in., perfectly glabrous, margin not ciliate, basal lobes deflexed or decurved, rarely horizontal; petiole ¼–½ in., quite smooth; stipules ½ in. *Peduncles* very slender; racemes ½–1 in. long, with only 3–5 bracts, which are usually very distant. *Sepals* obtuse. *Stamens* 5. *Style-arms* slender. *Nut* pale (ripe?) punctulate.—The inflorescence of this species is very characteristic and constant, and its habit being the same wherever it has been found, I am constrained to regard it as a distinct species, though in doing so I contravene Bentham's opinion as expressed in the "Flora Australiensis." My first knowledge of the plant was from Tasmanian specimens, which (Flora Tasmanica, i. 307) I referred to Brown's *P. strigosum*, and doubtfully to Meissner's plant of that name. I had then no opportunity of consulting Brown's Herbarium, which was during his lifetime closed to botanists. This being now accessible, I find that his *strigosum* is identical with the Indian plant subsequently published by Roxburgh as *P. horridum*. *P. prætermissum* is the *P. muricatum* var. *glabrata* of Wall. Cat. 1697/3, but not the *P. glabratum* of Meissner (in Wall. Cat. 6285), which is referable to *P. pedunculare*.

55. **P. pedunculare,** *Wall. Cat.* 1718; glabrous, stem 1–2 ft. ascending unarmed or angles with recurved prickles, leaves petioled elliptic oblong or linear-oblong acute base acute sagittate cordate or truncate, margin smooth or most minutely scaberulous, racemes panicled oblong or globose, peduncles glabrous or glandular-hispid, bracts acuminate ciliate, nut orbicular biconvex included in the perianth-tube. *Meissn. in DC. Prodr.* xiv. 1. 133, *in part*; *Miquel Fl. Ind. Bat.* i. 1011. P. dichotomum, *Blume Bijd.* 529? P. glabratum, *Wall. Cat.* 6285.

ASSAM, *Masters*. CACHAR, *Keenan*. The CONCAN, *Stocks*, &c. NILGHIRI and PULNEY MTS., *Wight*, &c. SINGAPORE, *Wallich*. MALACCA, *Cuming*. CEYLON, *Walker*.—DISTRIB. China, Java, Borneo, Philippine Islands, Australia.

It is difficult to define this variable plant in words. It may be a form of *P. strigosum*, but is certainly as distinct as are the species of the *Persicaria* and other sections of this perplexing genus. The following very distinct forms are united by exceptional ones.

P. pedunculare proper; glabrous, stem quite smooth except a few reversed prickles at the nodes and sometimes on the angles, leaves 1–2 in. elliptic-lanceolate or -ovate acuminate at both ends, peduncles and bracts glabrous or glandular pubescent. *Wight Ic.* t. 1802 C.—Singapore, Cachar, Pulney Mts., Ceylon.

Var. *robusta*; tall, stems stout glabrous unarmed or with reversed prickles at the angles and nodes, leaves 3–6 by ½–¾ in, linear-lanceolate acuminate at both ends, peduncles and pedicels stout glandular-hispid, heads large. *Wight Ic.* t. 1802 B.—Nilghiri and Pulney Mts.

Var. *angustissima*; stem nearly smooth, leaves petioled or upper sessile 4–5 by ¼–⅓ in. narrowly linear-lanceolate acuminate at both ends, peduncles very slender glandular-hispid, heads small, bracts glabrous. *Wight Ic.* t. 1802 A; *Polyg.* No. 49, *Herb. Ind. Or. H. f. & T.*—The Concan, Belgaum; &c., *Ritchie*, &c.; Nilghiris.

Var. *nilagirica*; stem nearly smooth, leaves petioled 4–6 by ¾–1 in. flaccid membranous, linear-oblong or oblong-lanceolate obtuse, peduncles very slender glandular-hispid, heads rather large, bracts subciliate.—Nilghiri Mts., at Conoor, alt. 6000 ft., *Clarke*.

Var. *assamica*; small, 6–10 in. high, stem nearly smooth, leaves subsessile or shortly petioled 1–2 by ¼–⅓ in. linear-lanceolate acute with an acute base or linear-oblong and obtuse with a contracted hastate base, peduncles very slender sparsely glandular-hispid, heads very small few-fld., bracts subhispid.—Assam, *Masters*; Jynteapore, *Clarke*.—This approaches in habit *P. prætermissum*.

Var. *glabrata*; tall, 12–18 in., stem nearly smooth except a few reversed bristles at the nodes, leaves linear-oblong 2–3 by ½–¾ in., base rounded and truncate, peduncles and heads as in var. *assamica*. P. glabratum, *Meissn. in Wall. Cat.* 6285.—Silhet.

Sect. X. ACONOGON, *Meissn.* Shrubs, rarely perennial-rooted herbs. *Leaves* usually broad; stipules tubular, eciliate. *Flowers* in branched panicles, pedicelled; bracts not tubular, very open. *Perianth* 5-partite. *Stamens* 8, rarely fewer, with or without interposed glands. *Styles* 2–3, short, free or connate below, stigmas capitate. *Nut* trigonous, not tightly enclosed in the perianth; cotyledons accumbent.

* *Tall herbaceous or shrub-like species. Flowers very small* $\frac{1}{12}$–$\frac{1}{6}$ *in. diam.; perianth cleft nearly to the cuneate base, segments spreading.*

56. **P. alpinum,** *All. Fl. Pedem.* i. 206, t. 68, f. 1; stem glabrous, or young parts softly pubescent, pale reddish or white, leaves shortly petioled lanceolate or linear-lanceolate acuminate glabrous or puberulous, flowers in terminal thyrsoid dense-fld. pyramidal panicles, perianth $\frac{1}{8}$–$\frac{1}{6}$ in. diam. cleft nearly to the cuneate base, inner segments obovate-spathulate, nut broadly rhomboid-ovoid acutely 3-gonous pale rather longer than the enlarged perianth. *Meissn. Monog. Polyg.* 56, t. 3 G; *Boiss. Fl. Orient.* iv. 1031. P. sibiricum, *Linn. fil. Suppl.* 228 (*not of Pallas*). P. acidum, *Pall. Reise* ii. 25, iii. 316 (*fid. Ledeb.*). P. divaricatum, *Vill. Dauph.* iii. 322 (*not of Linn.*). P. polymorphum & alpinum, *Meissn. in DC. Prodr.* xiv. 1. 139.

NORTH-WESTERN HIMALAYA; from Kulu to Kashmir, alt. 7–12 000 ft., *Thomson*, &c.—DISTRIB. Turkestan westward to S. Spain, Siberia, N. America.

Root perennial. *Stems* 6 ft., annual, grooved, paler than in any of the following species. *Leaves* 3–5 in., glabrous or finely pubescent beneath especially, margins flat; base acute; stipules long, lax, deciduous above the base. *Inflorescence* a foot long and more, of myriads of white or pale pink flowers; pedicels much longer than the short obtuse bracts, jointed close below the perianth or lower down. *Nut* $\frac{1}{6}$ in. long, shining.—This agrees well with the European and N. Asiatic plant. Boissier and Meissner give Affghanistan as a habitat, but Griffith's specimens have much larger sepals which conceal the much smaller nut, and the inflorescence is more corymbose; I refer them to *P. polystachyum*.—Eaten raw and cooked; tastes like rhubarb (*Aitchison*).

57. **P. paniculatum,** *Blume Bijd.* 533; shrubby, quite glabrous, branches terete, leaves petioled elliptic-ovate or -lanceolate acuminate or caudate-acuminate base acute or rounded, flowers in terminal large lax-fld. thyrsoid panicles, perianth $\frac{1}{12}$ in. diam., segments oblong, nut very small included in the simple or baccate perianth. *Meissn. Monog. Polyg.* 95, and in *DC. Prodr.* xiv. 1. 137; *Miquel Fl. Ind. Bat.* i. 1012.

TEMPERATE HIMALAYA, *Herb. Griffith*; Garwhal, alt. 5–6000 ft., *Duthie*; E. Nepal and Sikkim, alt. 7–8000 ft., *J. D. H.*—DISTRIB. Java.

A shrub, 4–6 ft., with flexuous branches that are not grooved. *Leaves* 5–7 by 2–3 in., firm, often black when dry. Margins ciliolate; nerves 15–30 pairs; petiole $\frac{1}{4}$–1 in.; stipules with a long limb deciduous above the base. *Panicle* effuse, quite glabrous; pedicels usually short, but here and there long; bracts minute, obtuse; flowers white. *Nut* $\frac{1}{12}$ in. long, turgidly ovoid, 3-gonous, black.—The Indian specimens are perfectly glabrous, Javan have minute pubescence on the midrid and nerves beneath. Duthie's Garwhal plant has more membranous fewer-nerved (10–14 pairs) leaves, and pedicels sometimes $\frac{1}{4}$ in. long; but the number of nerves varies remarkably in individual specimens of all the species of this section.

58. **P. rude,** *Meissn. in DC. Prodr.* xiv. 1. 137; shrubby, branches stout terete strigose with depressed hairs, leaves petioled elliptic-lanceolate acuminate softly pubescent beneath or on the nerves only, flowers in large terminal thyrsoid hirsute panicles, perianth $\frac{1}{12}$ in. diam., segments

oblong, nut very small exceeding the simple or baccate perianth. *Wall. Cat.* 1685/2. P. molle, *in part, Herb. Ind. Or. H. f. & T.*

KHASIA MTS., alt. 4–5000 ft., *De Silva, Mack*, &c.

A robust shrub, 6–8 ft.; branches stout, not grooved. *Leaves* 4–5 by 1½–2 in., glabrous or finely pubescent above, base acute, nerves 10–30 pairs; stipules glabrous or sparsely hairy. *Inflorescence* as in *P. paniculatum*, but laxly hirsute with flexuous hairs, flowers (white) and fruit nearly the same.

? Var. *sikkimensis*; branches glabrous except a few deflexed hairs at the nodes.—Sikkim; Lachen, alt. 10,000 ft. *J. D. H.*—Of this I have only a single specimen in fruit; it is unlike either *rude* or *molle* in its all but glabrous branches. The hairs of the nodes and laxly hirsute panicle are those of *P. rude*. The fruiting perianths are not baccate.

59. **P. molle**, *Don Prodr.* 72; shrubby, branches stout terete villous with erect or spreading hairs, leaves petioled elliptic-lanceolate silkily pubescent tomentose or villous beneath, flowers in large terminal thyrsoid tomentose panicles, perianth $\frac{1}{12}$ in. diam., segments oblong, nut included in the usually baccate perianth. *Meissn. Monog. Polyg.* 56, *in Wall. Pl. As. Rar.* iii. 64 (*partly*), and in *DC. Prodr.* xiv. 1. 136 (*excl. cit. of Wight Ic.*); *Lindl. in Bot. Reg.* 1841, *Misc.* 66. Coccoloba Totnea, *Ham. in Don Prodr.* 74.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton, Wallich*; Sikkim, alt. 5–7000 ft., *J. D. H., Clarke*. MISHMI HILLS, *Griffith*.

Habit and general characters of *P. rude*, but more softly tomentose, and with the hairs on the branches never deflexed, and stipules more silky. *Flowers* white.

60. **P. frondosum**, *Meissn. in DC. Prodr.* xiv. 1. 137; shrubby, quite glabrous, branches stout terete, leaves broadly ovate- or elliptic-oblong acuminate or caudate-acuminate, base rounded or cordate, flowers in short thyrsoid axillary and larger terminal dense-fld. panicles, perianth $\frac{1}{12}$ in. diam., segments oblong, fruiting long-pedicelled, nut small longer than the perianth. P. Hayii, *Herb. Strach. & Winterb. Polyg.* n. 34.

WESTERN HIMALAYA; Garwhal, *Falconer*; Kumaon, alt. 7500–9000 ft., *Edgeworth, Strachey & Winterbottom.*

A very distinct species, perfectly glabrous in all its parts, easily distinguished by its very broad leaves, 5–7 by 2½–3½ in., of firm texture, long petioles ½–1½ in., axillary panicles, and the long pedicels of the fruiting perianths ⅛–¼ in. long; the nuts are, however, so diseased that this last may be an abnormal character.

** *Tall herbaceous or shrub-like species. Flowers ¼ in. diam.; perianth cleft nearly to the cuneate base, segments widely spreading.*

61. **P. polystachyum**, *Wall. Cat.* 1686; shrubby, glabrous or pubescent, branches grooved, leaves subsessile or petioled oblong-lanceolate caudate-acuminate, base usually contracted and subhastately cordate or truncate, flowers in large pubescent or glabrate terminal thyrsoid spreading panicles with erect or decurved branches, pedicels very slender, perianth ¼ in. diam., 3 inner segments broadly obovate-spathulate, nut small triquetrous shorter than the unaltered perianth. *Meissn. in Wall. Pl. As. Rar.* iii. 61, and in *DC. Prodr.* xiv. 1. 137; *Bab. in Trans. Linn. Soc.* xviii. 111. P. molle, *Wight Ic.* t. 1807 (*not of Don*). Polyg. n. 69, *Herb. Ind. Or. H. f. & T.*

TEMPERATE HIMALAYA; from Mishmi to Kashmir, alt. 7000 to 12,000 ft., and to 14,000 ft. in Sikkim.—DISTRIB. Affghanistan.

Shrubby, 3–6 ft. high. *Leaves* 4–9 by 1½–3½ in., nerves very numerous, base of the uppermost usually acute, of the lower sometimes the same, but usually as described above; margins smooth or crisped; stipules ample, glabrous or sparsely hairy.

Panicle very variable in form, effuse, branches sometimes strict and erect or diverging, at others horizontal and decurved; bracts short, obtuse; pedicels sometimes ½ in.; flowers white or pink. *Sepals*, 2 outer oblong, inner much larger and broader. *Nut* pale, not tightly enclosed in the perianth.—The Affghanistan plant of Griffith (Journ. No. 1010) referred by Boissier and Meissner to *P. alpinum*, is, I think, certainly *P. polystachyum*.

Var. *glabra*, Meissn. l. c.; quite glabrous.

Var. *pubescens*, Meissn. l. c.; puberulous pubescent or tomentose with grey or buff tomentum on the leaves beneath.

Var. *longifolia*; leaves linear-oblong 8–9 by 2–2½ in. glabrous above finely pubescent beneath, base subcordately truncate, panicle small.—Sikkim; at Yakla, alt. 12–16,000 ft., *Clarke*.

Var. *crispata*; leaves glabrous margins crisped and undulately crenulate.—Chumba, *R. Ellis*.

Var. *Griffithii*; leaves densely clothed beneath with silky tomentum, stipules silky.—Mishmi Hills, *Griffith*.

62. **P. rumicifolium**, *Royle mss.*; *Bab. in Trans. Linn. Soc.* xviii. 112; herbaceous, glabrous or sparsely puberulous or laxly pubescent, stem very robust simple, leaves petioled broadly ovate or ovate-cordate obtuse or subacute, flowers in small axillary and terminal dense-fld. panicles, nut very broadly ovate acutely 3-gonous, about as long as the perianth. *Meissn in DC. Prodr.* xiv. 1. 138, *excl. var. oblongum*; *Garcke in Bot. Reise Pr. Waldem.* 136. P. ramoso-spicatum, *Klotzsch in Bot. Reise Pr. Waldem.* t. 87.

WESTERN HIMALAYA; from Nepal, *Wallich*, to Kashmir, alt. 10–14,000 ft., *Royle*, &c.

Root stout, perennial. *Stem* 6–18 in., as thick as a swan's quill or less, pale, grooved. *Leaves* 3–5 by 1½–3 in., succulent, green, margin even or undulate, nerves very slender; petiole ½–1 in., very stout; stipules large, lax, glabrous. *Panicles* sessile, the axillary ones usually shorter than the leaves; flowers green, ⅙–¼ in. diam. *Perianth* cleft to near the cuneate base, segments subequal, orbicular, spreading. *Nut* pale, very broad.—I think that some of Boissier's varieties of *P. alpinum* (*polymorphum*) are referable to this, which closely resembles the *P. alpinum*, var. *lapathifolium* of N.E. Asia and N.W. America, but has much larger flowers. I do not know what Babington's var. *β* is with retrorsely hairy stems and much smaller leaves. The young parts are acid, and eaten like rhubarb in the Western Himalaya. I find specimens of this distributed by Wallich from Nepal under the number 1727 (*Rheum emodi*) in Herbs. Hooker and Bentham, but not in the Linnæan Society Herb., where the species is absent.

*** *Tall, herbaceous or shrubby species. Perianth campanulate, cleft two-thirds way down, base rounded; lobes oblong erecto-patent.*

63. **P. campanulatum**, *Hook. f.*; pubescent or tomentose, stem creeping and stoloniferous below slender grooved, leaves petioled elliptic ovate or lanceolate acuminate or tip caudate base acute or rounded, flowers nodding or pendulous in terminal cymes with divaricate branches, nut 3-winged rather longer than the campanulate perianth. P. rumicifolium, *var. γ?* oblonga, *Meissn. in DC. Prodr.* xiv. 1. 138.—Polyg. n. 69 and 71, *Herb. Ind. Or. H. f. & T.*

TEMPERATE and SUBALPINE HIMALAYA; E. Nepal and Sikkim, alt. 9–12,000 ft., *J. D. H.*, *Clarke*; Kumaon, alt. 7500 ft., *Strachey & Winterbottom*.

Stem 2–3 ft. high, prostrate or ascending, dichotomously branched, glabrous or pubescent above. *Leaves* 3–6 by 1–2½ in., more or less pubescent on both surfaces with grey, or (beneath) buff tomentum, membranous or rather coriaceous; petiole ¼–½ in.; stipules ample, deciduous near the base or altogether. *Inflorescence* quite different from those of the other species of the section, and like that of *Fagopyrum cymosum*; branches pubescent or villous, short or long and flowering towards the extremity only; flowers pale pink or red, shortly pedicelled; bracts small, usually ovate, acute. *Perianth* ⅛–⅙ in. long, truly campanulate; lobes oblong, obtuse, subequal. *Stamens* 8, filaments very long. *Nut* pale, tip exserted.—A very distinct plant, which I have attempted to identify with the obscure *P. Hagei*, Royle. This, however, is described as having scabridly-hairy branches and peduncles, very short petioles, and broad leafless panicles, and as a native of Nagkunda, whence various collectors have sent *P. polystachyum*, but none the *P. campanulatum*, the form of whose perianth could scarcely have escaped notice.

Var. *membranifolia*; leaves large broad membranous, bright green, pubescence inconspicuous, cymes much smaller than the leaves.—Sikkim, in woods, alt. 6–10,000 ft.

Var. *longipes*; leaves elliptic ovate sparingly pubescent, branches of cymes dichotomous long naked leafy at the base.

Var. *fulvida*; leaves clothed beneath with dense matted fulvous tomentum. P. crispatum, *Clarke in Journ. Linn. Soc.* xv. 116 (*where it is taken for Roxburgh's Coccoloba crispata, which is P. chinense*).

64. **P. tortuosum,** *Don Prodr.* 71; a low shrub, glabrous or finely pubescent, much dichotomously branched, leaves sessile coriaceous elliptic obovate or orbicular obtuse or acute, panicles short terminal dense-fld., nut trigonous included in the campanulate perianth. *Meissn. in DC. Prodr.* xiv. 1. 138. P. tataricum, *Wall. mss.*

WESTERN HIMALAYA; Garwhal, at Gangotri, *Duthie*; Kunawur and Lahul, alt. 9–13,000 ft., *R. Inglis*, &c. WESTERN TIBET, alt. 15,500 ft., *Strachey & Winterbottom*; Ladak, alt. 16,500 ft., *Stewart.*

Root woody; branches 8–16 in., divaricate, geniculate, as thick as a goose-quill below, smooth, shining, red-brown. *Leaves* 1–2 in., pale green, crimson in autumn; nerves very slender; stipules short, truncate. *Panicles* ½–1 in. long, very dense-fld.; peduncles and very short pedicels pubescent. *Perianth* ⅛ in. long; lobes oblong, erect. *Stamens* 8, short. *Nut* pale, ovate.—A remarkable species. Meissner's var. *tibetanum* is the common state of the plant, closely allied to and possibly a state of *P. sericeum*, Pall. Don's habitat of Nepal is no doubt an error, as Wallich's mss. name of *P. tataricum*, cited by Don himself, shows.

Var. *spicata*; flowers in solitary simple terminal and axillary spikes longer than the leaves.—Dras, alt. 8–9000 ft., *Thomson.*

**** *Small herbaceous species with capitate or racemose panicles.*

65. **P. sibiricum,** *Laxm. in Nov. Act. Acad. Petrop.* xviii. (1773) 531, t. 7, f. 2; dwarf, quite glabrous, coriaceously-fleshy, branches many from the long perpendicular root erect or decumbent, leaves narrowly linear obtuse 2-auricled towards the base, flowers in capitate terminal panicles shorter than the leaves, nut enclosed in the perianth. *Meissn. in DC. Prodr.* xiv. 1. 139; *Ledeb. Fl. Ross.* iii. 527. P. hastatum, *Murr. Comm. Goett.* v. (1774) 37, t. 6; *Ledeb. Fl. Alt.* ii. 80, t. 361. P. crassifolium, *Murr. in Linn. Syst. Veg.* ed. 14, 378. P. rumicifolium, *Pall.* (*non Royle*). —Polyg. n. 37, *Herb Ind. Or. H. f. & T.*

WESTERN HIMALAYA; Kangra, alt. 11–12,000 ft., *Edgeworth.* WESTERN TIBET, common; alt. 12–15,000 ft., *Strachey & Winterbottom* (Polyg. n. 48), *Thomson*, &c.

Root several inches long, simple. *Stems* or branches 1–6 in., stout (much longer in Siberian specimens). *Leaves* 1–3 by 1/10–¼ in., flat, opaque, base cuneate being narrowed below the acute or obtuse equal or unequal auricles into a thick petiole; midrib broad, nerves invisible; stipules short, membranous. *Heads* of *flowers* ⅙–¼ in. diam. (effuse in Siberian specimens); bracts minute; pedicels short or long. *Perianth* 1/10 in. long, subglobose, pink, segments broadly oblong. *Stamens* 5–8, filaments short. *Nut* oblong-ovate, 3-gonous, black, shining, about as long as the perianth.—The larger Tibetan specimens are the size of small Siberian ones; the smallest Tibetan are quite minute.—Eaten in Tibet.

66. **P. acaule,** *Hook. f. Ic. Pl.* t. 1490 B; dwarf, diœcious, hirsute, leaves all radical sessile oblong obtuse, flowers in an erect narrow terminal peduncled panicle bearing short lateral dense-fld. branches, perianth very small subglobose or campanulate, nut 3-gonous exceeding the perianth. Polyg. n. 70, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA; Donkia and Kangra lama passes, on the Tibetan frontier, alt. 17,000 ft., *J. D. H.*

Rootstock very stout, ending below in a thick woody tap-root, simple or divided above into two or more very short branches clothed with membranous stipules. *Leaves* many, spreading or erect, 1 in. long or less, coriaceous, hirsute on both surfaces or beneath only, nerves above impressed; stipules glabrous or hirsute. *Panicle* with its peduncle 2–4 in. high; peduncle stout, naked (rarely with a single leaf), and rachis hirsute; branches $\frac{1}{8}$–$\frac{1}{4}$ in. long, horizontal or drooping; flowers crowded, often drooping. *Perianth* $\frac{1}{12}$ in. long, segments unequal oblong or rounded. *Stamens* 8, minute and imperfect in the female flower; filaments short. *Styles* 3, short, free. *Nut* (unripe) oblong, trigonous, base contracted (as if stipitate).—A remarkable species, evidently of this section, but very unlike any other.

67. **P. nummularifolium,** *Meissn. in DC. Prodr.* xiv. 1. 127; very small, stems creeping and forming matted tufts, nodes hairy, leaves $\frac{1}{10}$–$\frac{1}{8}$ in. petioled orbicular ciliate, stipules tubular hairy, clusters many-fld., flowers pedicelled subdiœcious?, sepals orbicular, stamens 5, nut orbicular biconvex.

ALPINE HIMALAYA; on rocks, Kumaon, *Edgeworth*, alt. 14–15,000 ft., *Strachey & Winterbottom*; Kashmir, alt. 13,400 ft., *Clarke*; Sikkim, alt. 14–17,000 ft., *J. D. H.*

Perennial. *Stems* one inch or two long, internodes short. *Leaves* rather fleshy, brown when dry; petiole as long as the blade; stipules truncate. *Flowers* numerous and large for the size of the plant, white or bright pink, males largest. *Stamens* very short; anthers purple. *Nut* included, smooth, pale; stigmas 2 minute subsessile. —The smallest species of the genus, and very unlike any other, referred by Meissner to § Cephalophilon, but the flowers are not capitate, and the minute styles are quite free.

Sect. XI. TINIARIA, *Meissn.* Twining unarmed annuals or with perennial roots. *Leaves* broad, cordate or hastate; stipules tubular, eciliate. *Flowers* axillary, or in slender racemes; bracts short, not tubular. *Perianth* 5-partite, 3 outer sepals at length enlarged and dorsally winged. *Stamens* 8 without interposed glands. *Styles* 3, very short, stigmas capitate or fimbriate. *Nut* 3-gonous; cotyledons accumbent.

68. **P. Convolvulus,** *Linn.*; *Boiss. Fl. Orient.* iv. 1032; annual, prostrate or twining, leaves sagittate-cordate, flowers in axillary clusters and terminal cymes, 3 outer sepals obtusely keeled rarely winged, pedicels short jointed above the middle. *Meissn. in DC. Prodr.* xiv. 1. 135; *Fl. Dan.* t. 744.

WESTERN HIMALAYA; Kunawur, *Royle*. WESTERN TIBET; Nubra, *Thomson*.— DISTRIB. N. and W. Asia, Europe, N. Africa.

Annual. *Stem* 1–4 ft., angles puberulous. *Leaves* 1½–4 in., gradually acuminate, angles obtuse or acute, puberulous beneath; petiole slender; stipules short. *Racemes* suberect, short, slender, pedicels recurved. *Perianth-segments* obtuse, green with white margins, $\frac{1}{8}$ in. in fruit. *Nut* black, $\frac{1}{10}$ in. long.

69. **P. dumetorum,** *Linn.*; *Boiss. Fl. Orient.* iv. 1032; stem twining or prostrate, leaves broadly ovate-cordate or subhastately cordate acuminate, fruiting perianth broadly oblong or obovate, 3 outer sepals broadly winged, pedicels very slender, not winged to the base, usually jointed below the middle, nut ⅛ in. long. *Meissn. in DC. Prodr.* xiv. 1. 135; *Fl. Dan.* t. 756; *Engl. Bot.* t. 2811.

TEMPERATE HIMALAYA; from Kunawur to Kashmir, alt. 4–9000 ft.—DISTRIB. Europe, N. and W. Asia.

Habit of *P. Convolvulus*, but stem terete, flowers more racemose, pedicels capillary, and fruiting perianth very different. This last varies exceedingly in size and shape from elliptic oblong ⅛ in. long, to cuneate-obovate ¼ in. long and tapering into the shortly winged pedicel. I find no difference between nuts of this and *P. Convolvulus.*

70. **P. pterocarpum,** *Wall. Cat.* 1690; stem twining, leaves broadly ovate-cordate acuminate, fruiting perianth cuneate-obovate rarely broadly oblong, 3 outer sepals broadly winged, pedicel very slender winged often to the base, nut ⅙ in. long. *Meissn. in Wall. Pl. As. Rar.* iii. 62, and in *DC. Prodr.* xiv. 1. 135; *Bab. in Trans. Linn. Soc.* xvii. 113.—Polyg. n. 62, *Herb. Hook. f. & T.*

TEMPERATE HIMALAYA; from Sikkim to Simla, alt. 6–9000 ft.,—also in Kashmir, *Stewart.*

Probably only a state of *P. dumetorum*, but the fruiting perianth is usually much larger, sometimes ½ in. long, or even 1¼ in. including the winged petiole, and the nut is always larger. In both there are obscure lines of pubescence on the stem and petioles.

DOUBTFUL AND IMPERFECTLY KNOWN SPECIES.

P. (Bistorta ?) GRIFFITHII, *Hook. f.*; very stout, leaves 6–7 in. long-petioled coriaceous oblong-lanceolate acuminate pubescent beneath, petiole as long as the blade, raceme incurved very stout, bracts lanceolate densely imbricate.—Bhotan Himalaya; on rocks above Sanah, alt. 9500–10,000 ft., *Griffith* (Itin. Notes, p. 410, n. 637).—A remarkable plant, and quite unlike any other, probably near to *P. Bistorta*, but much more robust. The curvature of the top of the peduncle is possibly due to this terminating a pendulous branch. The specimens are very imperfect; consisting of old, apparently radical leaves, and hollow glabrous stems or peduncles, a foot long and as thick as a goose-quill, each bearing the remains of two cauline leaves, and terminated by a stout incurved raceme 2½ in. long. The raceme is clothed with membranous bracts enclosing each many pedicels, from which the perianths have fallen. The stipules on the stem are 1–2 in. long, quite glabrous, with free tips.

P. HAGEI, *Royle mss*; *Bab. in Trans. Linn. Soc.* xviii. 110; *Meissn. in DC. Prodr.* xiv. 1. 139, from Nagkunda, is probably *P. polystachyum*, a common plant of that locality.

P. PALUDOSUM, *Griff. Rep. Bot. Gard. Calcutt.* 1843, 39, is a mss. name and unidentifiable.

POLYGONEARUM FAMILIÆ SEDIFOLIA, *Wall. Cat.* 6286; see p. 22.

4. FAGOPYRUM, *Gærtn.*

Erect herbs. *Leaves* deltoid, hastately deltoid, or -cordate. *Flowers* in terminal or axillary cymes. *Perianth* 5-partite; segments subequal, not enlarged in fruit. *Stamens* 8, alternating with glandular disk-lobes. *Ovary* 3-gonous; styles 3, stigmas capitate. *Nut* much longer than the perianth, 3-gonous. *Cotyledons* very broad, twisted, or rolled round the ascending radicle.—Species 3, Europe and Temp. Asia, one cultivated.

1. **F. esculentum,** *Moench Method.* 290; annual, glabrous, leaves triangular-cordate acute, flowers in axillary and terminal peduncled subcapitate many-fld. cymes, nut ovate angles acute. *Meissn. in Wall. Pl As. Rar.* iii. 63, and in *DC. Prodr.* xiv. 1. 143; *Bab. in Trans. Linn. Soc* xviii. 117. F. emarginatum, *Meissn. in DC. l. c., excl. var. β.*; *Bab. l. c* 118. Polygonum Fagopyrum, *Linn.*; *Roxb. Fl. Ind.* ii. 292; *Wall. Cat* 1687. P. dioicum, *Ham. mss.* P. emarginatum, *Roth Catalect. Bot.* i. 48; *Don Prodr.* 73.

Cultivated in the KHASIA MTS., throughout the HIMALAYA and WESTERN TIBET at elevations of 2000 to 12,000 ft., and in the NILGHIRI HILLS.—DISTRIB. Centre of Europe and N. Asia.

Stem 1–3 ft. *Leaves* 1–4 in. diam. (5 in very large specimens). *Flowers* pink or white, in heads or compound cymes ½–¾ in. diam. *Nut* ¼–⅓ in. long, pale.

2. **F. cymosum,** *Meissn. in Wall. Pl. As. Rar.* iii. 63, and in *DC. Prodr.* xiv. 1. 144; puberulous, root perennial, leaves triangular, flowers secund on the long recurved branches of peduncled terminal and axillary cymes, nut ovate angles acute. *Bab. in Trans. Linn. Soc.* xviii. 119; *Lindl. Bot. Reg.* 1847, t. 26. F. triangulare, *Meissn. ll. c.* F. emarginatum, *var.* kunawarense, *Meissn. in DC. l. c.* 143. Polygonum cymosum, *Treviran. Delect. Sem. Hort. Vratisl.* 1824; *Reichb. Ic. Exot.* ii. t. 176. P. acutatum, *Lehm. Cat. Sem. Hort. Hamb.* 1820. P. triangulare, *Wall. Cat.* 1689. P. emarginatum, *Wall. Cat.* 1688 (*not of Roth*). P. dibotrys, *Don Prodr.* 73. P. volubile, *Turcz. in Bull. Soc. Imp. Nat. Mosq.* 1840, 77. P. rugosum, *Herb. Ham.*

TEMPERATE HIMALAYA; in woods, &c., from Kashmir to Sikkim, alt. 5–11,000 ft. KHASIA MTS., alt. 4–5000 ft.—DISTRIB. Yunan.

A tall branching perennial-rooted sparsely pubescent species. *Leaves* large, usually 3–4 in. diam., angles acute or obtuse, upper usually narrow and amplexicaul; petiole long, slender. *Inflorescence* very lax, branches of panicle 2–5 in. long; flowers pedicelled, white. *Nut* ¼–⅙ in., more than twice as long as the perianth.—I suspect that Meissner has described the fruit of *tataricum* under his *F. triangulare.*

3. **F. tataricum,** *Gærtn. Fruct.* ii. 182, t. 119, f. 6; annual, glabrous, leaves very broadly triangular-cordate or -hastate, flowers in axillary and terminal peduncled subcapitate cymes, nut with 3 deep grooves and rounded angles. *Meissn. in DC. Prodr.* xiv. 144. F. rotundatum, *Bab. in Trans. Linn. Soc.* xviii. 117; *Meissn. l. c.* Polygonum tataricum, *Linn.*; *Don Prodr.* 74; *Meissn. Monog. Polyg.* 62, t. 4, 8; *Dalz. & Gibs. Bomb. Fl. Suppl.* 74.

Cultivated throughout the HIMALAYA, at elevations of 3–12,000 ft.—DISTRIB. N. Europe and N. Asia.

Stem 2–3 ft., usually simple. *Leaves* 1–2 in. diam. *Flowers* white or pink. *Nut* ⅙ in. long, conico-ovoid, opaque, rounded, angles keeled towards the tip.

5. RHEUM, *Linn.*

Stout herbs with woody large roots. *Leaves* large, entire toothed or lobed; stipules scarious. *Flowers* clustered in panicled racemes, usually 2-sexual. *Sepals* 5. *Stamens* 6–9. *Ovary*, 2–4-angled; styles 2–4, stigmas dilated capitate or horseshoe-shaped. *Nut* 2–4-winged, very much larger than the usually unchanged sepals. *Embryo* straight, cotyledons broad.—Species 20, Central Asia and the Himalaya.

* *Stemless species. Flowers in a spike-like raceme.*

1. **R. spiciforme,** *Royle Ill.* 318, t. 78; leaves all radical thickly

coriaceous orbicular broadly ovate or cordate glabrous or stellately puberulous beneath, racemes 1–3 glabrous, fruit broadly ellipsoid or oblong, wings broader than the disk. *Meissn. in DC. Prodr.* xiv. 1. 36. R. Moorcroftianum, *Meissn. l. c. (not of Royle)*; *Herb. Ind. Or. H.f. & T.*

WESTERN HIMALAYA; in the drier ranges, from Kumaon, alt. 14–16,000 ft. westwards to WESTERN TIBET, alt. 9–14,000 ft., abundant.—DISTRIB. Affghanistan.

Root short or long, thicker than the thumb. *Leaves* all radical, 6–12 in. diam., very leathery, with prominent radiating nerves and reticulated nervules beneath, red-brown in age; petiole 3–6 in., very stout, glabrous or puberulous. *Racemes* 1–3, radical, 4–12 in., strict, dense-fld.; peduncle and rachis stout, glabrous; bracts minute, ovate, scarious; flowers 1/16 in. diam., on capillary pedicels. *Fruit* ⅓–½ in. long, 3–4 times as long as the oblong obtuse sepals, tip rounded or notched, wings membranous; pedicel half as long as the fruit or less.

2. **R. Moorcroftianum**, *Royle Ill.* 315, 318; leaves all radical thickly coriaceous orbicular glabrous or stellately puberulous beneath, racemes pubescent, fruit ovoid, wings narrow. *Wall. Cat.* 1727, *in part.*

WESTERN HIMALAYA; Kumaon, *Moorcroft in Herb. Wallich.*

I am uncertain about this plant, which differs from *R. spiciforme* in the very much larger pubescent peduncles and racemes, which together are two feet long, and in the form of the fruit. The only specimens are Wallich's, are very bad, and have neither locality nor collector's name. They are ticketed "large broad-leaved small-stalked Rhubarb; the root more purgative than the long-stalked." Another sheet has attached to it, a ticket in the same handwriting, "narrow round-leaved long-stalked Rhubarb." *R. Moorcroftianum* is written in pencil on the sheets, I think by Royle (certainly not by Wallich). Hence they are no doubt the plants mentioned by Royle (Ill. Pl. Himal. 315) as brought by Moorcroft from Niti, alt. 12,000 feet, in Kumaon, and of which Royle says that "Major Hearsey, Moorcroft's companion, has described two kinds to me, one round-leaved and short-stalked, and the other short-stalked, but large and broad-leaved (*R. Moorcroftianum*, nob.) with the root more purgative than that of the former." From this it appears that Royle, not Wallich, as hitherto supposed, is the author of *R. Moorcroftianum*; and that Meissner is further in error in describing it as everywhere glabrous.

** *Stemless species. Flowers panicled; panicles leafless.*

3. **R. tibeticum**, *Maxim. mss.*; leaves very coriaceous orbicular-cordate and short thick petioles scaberulous, fruit nearly orbicular notched at both ends, wings very broad. Rheum, No. 6, *Herb. H. f. & T.*

WESTERN HIMALAYA; Zanskar, *Thomson*; Kashmir, Barji la, alt. 12,000 ft., *Clarke.* WESTERN TIBET; common, alt. 12–14,000 ft., *Thomson*, &c.

Root very stout. *Leaves* 6–12 in. diam., entire or crenulate, nerves 5 very stout radiating from the petiole which is 4–8 in. long and as thick as the finger. *Panicles* puberulous or quite glabrous, with the peduncle 4–10 in. high, fruiting a foot high; branches erecto-patent, simple or again branched; fruiting peduncle very thick, deeply grooved; bracts very minute; flowers 1/12 in. diam., pedicels short. *Fruit* ⅓ in. long and broad, four times as large as the unchanged sepals; wings much broader than the nucleus.—Resembles *R. leucorhizum*, Pall., but none of the sepals enlarge in fruit.

*** *Stem branched and panicle leafy.*

4. **R. emodi**, *Wall. Cat.* 1727; stem tall leafy, leaves long-petioled very large orbicular or broadly ovate obtuse base cordate 5–7-nerved, panicle papillosely puberulous fastigiately branched and leafy, flowers dark purple, fruit ovoid-oblong base cordate apex notched wings narrow. *Meissn. in Wall. Pl. As. Rar.* iii. 65, and in *DC. Prodr.* xiv. 1. 35 (*exclude syn. Webbianum*); *Bot. Mag.* t. 3508. R. emodium, *Wall. mss.*; *Nees & Eberm.*

Med. Pharm. Bot. i. 455. ? R. australe, *Don Prodr.* 75, *Hayne Arnz. Gewachs.* 12, t. 6; *Nees Pl. Offic. Suppl.* 5, t. 5, 6; *Sweet, Brit. Fl. Gard.* t. 269.

SUBALPINE and ALPINE HIMALAYA; Nepal, *Wallich*; Sikkim, *Io. Cathcart*; ? Simla, on Choor, alt. 11–12,000 ft., *Edgeworth*.

Root very stout; stem very stout, 5–6 feet high, streaked green and brown. *Radical leaves* often 2 ft. diam., papillose beneath, subscaberulous above; petiole 12–18 in., very stout, scaberulous. *Panicle* 2–3 ft., with erect strict branches; flowers ⅛ in. diam. *Fruit* ½ in. long, purple, wings narrower than the disk.—I am not quite satisfied as to the synonymy of this plant, for it is difficult to distinguish it in a dried state from *R. Webbianum*. Wallich's are the only native specimens I am sure about; for the Sikkim locality I depend on an excellent drawing in the Kew collection, made by Mr. Cathcart's artists in Darjiling. Edgeworth's has the larger flowers of this, but the habit and glabrous panicle of *emodi*.

5. **R. acuminatum,** *Hook. f. & Thoms. mss. in Bot. Mag.* t. 4877; stem leafy, leaves long-petioled triangular- or orbicular-ovate acuminate base cordate 5–7-nerved, panicles papillosely puberulous fastigiately branched and leafy, flowers dark red, fruit ovoid-oblong base cordate tip entire or notched, wings narrower than the nucleus.

SIKKIM HIMALAYA; alt. 10–13,000 ft., *J. D. H.*, *Clarke*.

Probably only a small form of *R. emodi* with acuminate leaves, but the flowers are considerably larger, and though long under cultivation it does not attain half the size of that plant, or vary in its character.

6. **R. Webbianum,** *Royle Ill.* 318, t. 17 a; stem leafy, leaves long-petioled orbicular-cordate or reniform 5–7 nerved papillose or glabrous, tip rounded or subacute, panicles axillary and terminal quite glabrous, flowers pale yellowish, fruit broadly oblong or orbicular notched at both ends. R. emodi, *Wall. Cat.* 1727 C; *Herb. Strach. & Winterb.*; *Herb. H. f. & T.*

CENTRAL and WESTERN ALPINE HIMALAYA; from Nepal to Kashmir, alt. 10–14,000 ft.

Very variable in size, from 1 to 6 ft. high, with leaves 4 in.–2 ft. in diameter; flowers very much smaller than in *R. emodi*, the panicle less strict and quite glabrous, and the fruit broader (⅓ in. diam.), with broader wings more like that of *C. spiciforme*.—Royle describes the leaves as somewhat hairy above, but they are quite glabrous in most of the specimens. The habit differs a good deal from that of *R. emodi*, the inflorescence being more axillary, and its branching more diffuse after flowering. The flowers are not above $\frac{1}{12}$ in. diam., on capillary pedicels without bracts.

**** *Stem simple; panicles axillary concealed by bullate bracts.*

7. **R. nobile,** *Hook. f. & Thoms.*; *Ill. Himal. Pl.* t. 19; stem simple densely clothed with reflexed inflated imbricating (downwards) bladder-like reticulated bracts which conceal the short axillary panicles, leaves ovate-oblong or rounded base cuneate or cordate, fruit broadly ovoid 2–4-winged, disk tuberculate. *Meissn. in DC. Prodr.* xiv. 1. 36.

SIKKIM HIMALAYA; in the interior ranges, alt. 13–15,000 ft., *J. D. H.*, *Clarke*.

Root very long, 3 in. diam. and under. *Leaves* very coriaceous, 1 foot diam. and under, usually edged with red, upper passing into the bracts; petiole 2–6 in., stout; stipules voluminous, 6–8 by 4–6 in., rose-red. *Stem* 3–4 ft., as thick as the wrist below, deeply grooved. *Bracts* orbicular, 6 in. diam., pale straw-coloured, reticulate, deciduous in age. *Panicles* 3–4 in., branched, glabrous; and flowers crowded, $\frac{1}{10}$ in. diam., green. *Fruit* ¼ in. long.—Gill, in his "River of the Golden Sands," speaks of a plant inhabiting the lofty regions of East China bordering Tibet, which is probably this or an allied species.

6. **OXYRIA**, *Hill.*

An erect herb, with stout rootstock. *Leaves* chiefly radical, orbicular-cordate or reniform; stipules broad, lax. *Flowers* in panicled racemes, 2-sexual. *Sepals* 4, 2 outer reflexed; 2 inner larger, erect, appressed. *Stamens* 6. *Ovary* compressed; styles 2, short, stigmas fimbriate. *Nut* biconvex, 2-winged. *Embryo* lateral, nearly straight, cotyledons linear-oblong.

O. digyna, *Hill*; *Boiss. Fl. Orient.* iv. 1004; leaves cordate or reniform. O. reniformis, *Hook. Fl. Scot.* 111; *Meissn. in DC. Prodr.* xiv. 1. 37; *Engl. Bot.* t. 910. O. elatior, *Br. in Wall. Cat.* 1726; *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. l. c.*; *Royle Ill. Pl. Him.* 314; *Hook. Ic. Pl.* t. 483.

ALPINE HIMALAYA; from Sikkim to Kashmir, alt. 10–14,000 ft. WESTERN TIBET, alt. 12–17-500 ft.—DISTRIB. Mts. of Europe, N. Asia and America, Arctic Regions.

Glabrous, fleshy. *Rootstock* tufted, with many erect succulent stems 4–18 in. high. *Leaves* radical, many, long-petioled, 1–4 in. diam., rarely 3-lobed or subhastate, cauline 1–2; petiole sometimes 8 in. *Racemes* slender, lax-fld.; pedicels jointed in the middle, tip thickened. *Outer sepals* spreading or reflexed; inner spathulate, 3–5-nerved. *Fruit* $\frac{1}{8}$–$\frac{1}{4}$ in. diam., orbicular-cordate, wing membranous veined top notched.—A most agreeable salad, raw and cooked. Except in often attaining a very large size (18 in. high), the Himalayan plant does not differ from the European.

7. **RUMEX**, *Linn.*

Perennial herbs, or annuals, rarely shrubby. *Leaves* various; stipules often disappearing with age. *Flowers* in axillary clusters or in whorls arranged in simple or panicled racemes. *Sepals* 6 (rarely 4); outer unchanged, inner enlarging entire or toothed, midrib or disk often enlarged or tubercled. *Stamens* 6. *Ovary* 3-gonous; styles 3, stigmas fimbriate. *Nut* included in the usually enlarged inner sepals (valves) angles acute. *Embryo* lateral, nearly straight; cotyledons linear or oblong.—Species described about 100 (probably greatly exaggerated), in all temperate and some tropical countries.

I think that this genus wants revision and a very great reduction of species, when most of the Indian ones will be referred to European, in the directions I have indicated under each.

Sect. I. **Lapathum**, *Meissn.* *Flowers* 2-sexual. *Styles* terminal. *Inner sepals* (valves) coriaceous much enlarged in fruit. *Leaves* not hastate.

Inner fruiting-sepals quite entire, disk tumid or not.

1. **R. orientalis**, *Bernh.*; *Boiss. Fl. Orient.* iv. 1009; tall, stout, leaves elongate-oblong obtuse base cordate, racemes in an open lax or thyrsoid dense panicle, whorls crowded, pedicels about equalling the fruiting perianth, valves broadly orbicular-cordate obtuse reticulate quite entire with or without a small tubercle. *Meissn. in DC. Prodr.* xiv. 1. 51. R. Dioscoridis, *Hayne Arnzeik.* xiii. 5, t. 5.

WESTERN HIMALAYA; Kumaon to Kashmir, alt. 6–9000 ft., *Falconer*, &c.

WESTERN TIBET; alt. 11–18,000 ft., *Thomson*, &c.—DISTRIB. Westward to Asia Minor, Syria and Greece.

Stem 3–4 ft., often very stout, deeply grooved. *Lower leaves* 1–2 ft., upper narrow at the base. *Valves* ¼–⅙ in. long, quite entire in all Indian specimens, pale, flat, finely reticulate.—The Indian specimens with no tubercle resemble *R. aquaticus*, L., and those with a tubercle *R. Patientia*, and I do not see why all these should not be united.

** *Inner fruiting-sepals with very narrow margins and few or no teeth.*

2. **R. maritimus**, *Linn.*; *Meissn. in DC. Prodr.* xiv. 1. 59; annual, leaves lanceolate narrowed into the petiole, panicle leafy to the top, valves rhombic- or oblong-ovate with a lanceolate tip all with an oblong tubercle unarmed or with 2–3 long needle-like spines. *Fl. Dan.* t. 1208. R. palustris, *Sm. Fl. Brit.* i. 394; *Fl. Dan.* t. 1873; *Boiss. Fl. Orient.* iv. 1014. R. Wallichii, *Meissn. l. c.* 48. R. Wallichianus, *Meissn. in Wall. Pl. As. Rar.* iii. 64. R. acutus, *Roxb. Fl. Ind.* ii. 208. R. Roxburghianus, *Wall. Cat.* 1731, *in part.* R. comosus & setaceus, *Ham. mss.*; *Wall. Cat.* 6287, 6288. R. chinensis, *Campd. Rum.* 63, 76.

Marshes in ASSAM, SILHET, CACHAR, and BENGAL, common.—DISTRIB. Europe, Asia, N. Africa, N. and S. America.

Stem 1–4 ft., angled and deeply grooved. *Leaves* 3–10 in., petioled, base always narrowed into the petiole. *Whorls* of flowers lax or dense, many- or few-fld. *Fruiting perianths* all unarmed, or, on the same plant, some armed and some unarmed, yellow brown when ripe, tubercle smooth, with a narrow sometimes reticulate margin; spine sometimes 4 times as long as the valve, tip straight or slightly hooked.—The fruit varies greatly in size and number and length of the spines or the valves, and I am quite unable to discriminate between the various plants I have here referred to *R. maritimus.*

3. **R. nigricans**, *Hook. f.*; annual, leaves linear-oblong obtuse contracted above the cordate base, flowering branches rigid divaricate leafy or leafless, fruiting perianths densely crowded in globose distant or confluent heads, turning black in drying, pedicels short, valves with very large oblong dark tubercles and lanceolate tips, margins very narrow entire or with one or two short straight teeth or spines. R. dentatus, *Wall. Cat.* 1730 (*not of Linn.*).

BENGAL, *Clarke*. KHASIA MTS., *Griffith*. BEHAR, *J. D. H.* DECCAN PENINSULA, *Herb. Heyne* (*Wallich*).

Stem 6–18 in., angled and grooved. *Leaves* 6–8 by 1–1½ in., thin; petiole long, slender. *Fruiting perianth* much larger than in *R. maritimus*, very dark when dry, as is the whole raceme.—Closely resembles *R. conglomeratus*, but the leaf is *panduriform*, and the tips of the valves acute.

*** *Inner fruiting-sepals with broad much-toothed wings.*

4. **R. dentatus**, *Linn.*; *Boiss. Fl. Orient.* iv. 1013; annual, leaves oblong obtuse often contracted above the rounded or cordate base, often waved or crisped, whorls distinct leafy or not, fruiting perianth ovate or oblong-ovate with an oblong smooth tubercle and broad densely reticulated wings which are irregularly toothed, teeth short stout straight. *Meissn. in DC. Prodr.* xiv. 1. 56 (*excl. syn. Wall. Cat.*). R. Roxburghianus, *Wall. Cat.* 1731, *in part.* R. Klotzschianus, *Meissn. l. c.* 57. R. obtusifolius, *Herb. Ham.*, *Wall. Cat.* 6289. Rumex, No. 3, *Herb. Strach. & Winterb.*

From ASSAM and SILHET to the INDUS, common, ascending the Himalaya to 1000 ft. SCINDE, *Stocks*. The CONCAN, *Law*, &c.

Habit of *R. Patientia*, L., to which this is closely allied. Distinguishable from the other Indian annual species by its broad irregularly-toothed wings, the teeth of which are not hooked.—A specimen from Oude has very narrow wings, and thus shows a transition to *nigricans*. I cannot in Herbarium specimens distinguish large specimens of this with petioled floral leaves cordate at the base from states of *R. nepalensis*. Except for its shorter pedicels, this would pass for *R. obtusifolius*, L.

5. **R. nepalensis,** *Spreng. Syst.* ii. 159; perennial?, tall, branched, radical leaves large oblong ovate-oblong or triangular-ovate acute or obtuse base widely or narrowly cordate, upper sessile or petioled similar or with narrowed bases, racemes elongate, whorls distant, valves orbicular-ovate one or all with an oblong tubercle broadly winged, wing pectinately toothed strongly reticulate, teeth usually hooked at the tip. *Boiss. Fl. Orient.* iv. 1011; *Wall. Cat.* 1728; *Meissn. in Wall. Pl. As. Rar.* iii. 64, *in Linnæa* xiv. 192, and in *DC. Prodr.* xiv. 1. 55; *Wight Ic.* t. 1810. R. Roxburghianus, *Schultes fil. Syst.* vii. 1402 (*not of Wallich*). R. hamatus, *Trevir. in Nov. Act. Leopold.* xiii. 174; *Meissn. in DC. l. c.* 56. R. ramulosus, *Meissn. in DC. l. c.* R. peregrinus, *Boiss. Diagn. Ser.* 1, v. 46. R. tuberosus, *Roxb. in Herb. Willd.* (*ex Meissn.*). R. uncinatus, *Hort.*

TEMPERATE HIMALAYA; from Bhotan to Kashmir, alt. 4–9000 ft. (12,000 on the Chenab, *Stewart*). KHASIA MTS. ?. WESTERN PENINSULA; on the Ghats from the Concan to the Nilghiris.—DISTRIB. Westward to Asia Minor, Java, S. Africa.

Root with tuberous fibres (Boissier). *Stem* 2–4 ft., stout, erect. *Lower leaves* often 6–14 by 3–5 in., undulate or not; petiole very slender, upper petioled or sessile. —Probably not specifically different from *R. pulcher*, L.

Sect. II. **Acetosa,** *Tournef.* *Flowers* unisexual or polygamous. *Styles* arising from the angles of the ovary, inner sepals (valves) much enlarged, membranous, entire, midrib with a deflexed tubercle near its base. *Leaves* hastate.

6. **R. scutatus,** *Linn.*; *Boiss. Fl. Orient.* iv. 1015; perennial, polygamous, papillose, stem creeping below branched, leaves all long-petioled hastately cordate or sub-3-lobed lateral lobes rounded suddenly contracted into the narrower midlobe, racemes very slender, whorls 2–4-fld. distant, valves cordate at the base. *Meissn. in DC. Prodr.* xiv. 1. 69; *Campd. Rum.* 132, t. 2, f. 6. R. hastifolius, *M. Bieb. Fl. Taur. Cauc.* i. 290.

WESTERN HIMALAYA; Simla; *Thomson*.—DISTRIB. Persia and westward to Middle and South Europe and N. Africa.

Somewhat glaucous. *Branches* slender, 1–2 ft., flexuous, dichotomously divided, ending in long lax panicles. *Leaves* 1–2 in. diam., the lobes all broad. *Flowers* small; pedicels jointed about the middle, elongating in fruit.—The specimens are not in fruit.

7. **R. hastatus,** *Don Prodr.* 74; glaucous, polygamous, branches erect from a stout shrubby base all petioled rhombic deltoid or hastately 3-lobed with the lobes all narrow, racemes very slender panicled, whorls few-fld. distant, valves orbicular notched at both ends. *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. Prodr.* xiv. 1. 72; *Wall. Cat.* 1729.

HIMALAYA; from Kumaon to Kashmir, alt. 1–8000 ft. BHOTAN, *Booth*.—DISTRIB. Affghanistan.

Rootstock woody, often as thick as the thumb; branches much divided, slender, 1–2 ft., obscurely angled. *Leaves* ½–1 in., coriaceous, nerveless. *Racemes* ending the branches, rachis filiform; flowers very small, pedicels lengthening in fruit. *Valves* ⅙–¼ in. diam., often pink, very delicately veined.

8. **R. acetosa,** *Linn.*; *Boiss. Fl. Orient.* iv. 1015; perennial, diœcious,

green, stem subsimple, radical leaves petioled oblong obtuse base cordate hastate or sagittate, cauline sessile, racemes lax, whorls 6–8-fld., outer sepals reflexed, valves orbicular. *Meissn. in DC. Prodr.* xiv. 1. 64; *Fl. Dan.* t. 2534; *Engl. Bot.* t. 127.

WESTERN HIMALAYA; from Kumaon to Kashmir, alt. 8–12,000 ft.—DISTRIB. N. Asia, Europe from the Caucasus westward, N. America.

Root of slender fibres, from a short woody stock. *Stem* 1–2 ft., deeply grooved. *Leaves* 2–6 in.; petiole of lower slender; stipules ragged. *Panicle* contracted; branches strict, erect, leafless. *Sepals* of male with scarious margins. *Valves* of ripe female perianth broadly ovate-cordate, pink or crimson.

9. **R. vesicarius,** *Linn.*; *Boiss. Fl. Orient.* iv. 1017; annual, monœcious, glabrous, branched from the root, rather fleshy, leaves petioled elliptic ovate or oblong 3–5-nerved, base cuneate rarely cordate or hastate, racemes short terminal and leaf-opposed leafless, flowers pedicelled sometimes 2-nate and connate, valves large orbicular 2-lobed at each end very membranous and reticulate without a marginal nerve. *Meissn. in Wall. Pl. As. Rar.* iii. 64, and in *DC. Prodr.* xiv. 1. 70; *Roxb. Fl. Ind.* ii. 209; *Campd. Rum.* 129, t. 3, f. 1. 8.; *Wall. Cat.* 1732.

WESTERN PANJAB; on the Salt range, and trans-Indus hills; cultivated and an escape in other parts of India.—DISTRIB. Affghanistan, Persia, the Levant, and N. Africa.

Pale green, 6–12 in. high, dichotomously branched. *Leaves* 1–3 in., obtuse or acute; petiole as long as the blade. *Racemes* 1–1½ in.; pedicels slender, jointed about the middle or unjointed. *Fruit* ½ in. diam., white or pink, valves hyaline.

SECT. III. **Acetosella,** *Meissn. Flowers* diœcious. *Styles* arising from the angles of the ovary. *Inner sepals* herbaceous, hardly enlarged in fruit. *Leaves* hastate.

10. **R. acetosella,** *Linn.*; *Boiss. Fl. Orient.* iv. 1018; perennial, stem slender simple or branched from the base, lower leaves petioled lanceolate or hastate, uppermost sessile, racemes leafless, flowers minute, pedicels jointed at the top. *Meissn. in DC. Prodr.* 63; *Fl. Dan.* 1161; *Engl. Bot.* t. 1674.

EASTERN HIMALAYA; Sikkim, at Darjeeling, alt. 7–8000 ft., *Clarke*; introduced?—DISTRIB. Europe, N. Africa, N. Asia.—Introduced elsewhere.

Glabrous, often bright red in autumn; rootstock creeping, much branched. *Leaves* ½–2 in., variable in breadth and form; stipules silvery, torn. *Racemes* erect; male fl. largest. *Fruiting sepals* oblong, erect, closely appressed to the small 3-gonous fruit.—*Sheep-sorrell.*

ORDER CXX. PODOSTEMONACEÆ.

Aquatics, growing on stones in tropical streams, annual or perennial. *Stem* branched with leaves, or with these confluent into amorphous fronds. *Inflorescence* various, often of a 1- or many-flowered scape, naked or arising from a tubular sheath. *Flowers* 1-sexual, rarely diœcious, usually enclosed in a spathe. *Perianth* 0, or membranous, lobed or partite or of a few scales. *Stamens* definite or not, free or connate, hypogynous or perigynous, filaments flat; anthers 2-lobed. *Ovary* free, sessile or stalked, smooth or ribbed, 1–3-celled; styles 2–3, or one and columnar, stigma one capitate, or 2–3, simple toothed or laciniate; ovules many, anatropous, axile or parietal. *Capsule* 1–3-celled; septicidal or septifragal, valves 2–3. *Seeds* minute, testa mucilaginous, albumen 0; embryo straight, cotyledons 2, radicle inferior.—Genera 21; species about 120, chiefly tropical.

An Order of very doubtful affinity, some genera of which I am disposed to regard as perhaps consisting of reduced forms of *Scrophularineæ* or *Lentibularineæ*. The species are probably very numerous in India, though unknown in rivers having snow-feeders. I have followed Weddel's most careful monograph in describing the Indian species, reducing the genera in accordance with Bentham's revision of these in the Genera Plantarum. I suspect that an examination of more copious materials will modify the characters of the species, and perhaps bring some of them together as varieties or forms of dimorphic or polymorphic plants.

Tribe I. **Tristicheæ.** *Flowers* 2-sexual. *Stamens* 1–3. *Ovary* 3-celled. *Styles* 3.

Stamens 3 . . . . 1. TERNIOLA.

Tribe II. **Eupodostemeæ.** *Perianth* of 2 rarely 3 scales. *Stamens* 1, or 2–3 with the filaments connate.

Stigmas subsessile, broad, flat, crested. Stamens 2 . . . . 2. HYDROBRYUM.
Stigmas short, linear or ovate, entire. Stamens 2 . . . . . . 3. PODOSTEMON.

1. TERNIOLA, *Tulasne.*

Stems confluent into an expanded horizontal lobed frond, or in one species long and floating. *Leaves* minute, setaceous. *Flowering-buds* adnate to the base of the stem, or scattered along the elongated branches; pedicel solitary, with a ring of scale-like leaves usually forming a short sheath round its base. *Flowers* 2-sexual. *Perianth* hyaline, 3-lobed. *Stamens* 3, filaments free. *Ovary* 3-celled; styles 3, spreading; inner, linear; placentæ thick, in the inner angles of the cells. *Capsule* ovoid, septicidally 3-valved, valves equal, septa vanishing.—Species 7, all Indian.

* *Stems frond-like horizontal.*

1. **T. zeylanica,** *Tul. Monogr. Podost.* 190, t. 13, f. 3; plant flat suborbicular or irregularly lobed, leaves some very narrow in rosettes, others connate into a short broad tubular or cup-shaped echinate sheath with a ciliate mouth. *Wedd. in DC. Prodr.* xvii. 46. T. ceylanica, *Wight Ic.* t. 1919. Tristicha zeylanica, *Gardn. in Calc. Journ. Nat. Hist.* vii. 177. Lawia zeylanica, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 112. Dalzellia zeylanica, *Wight l. c.* 34. Mnianthus zeylanicus, *Walp. Ann.* iii. 443.

CEYLON; on smooth gneiss rocks in streams at Peradenyia.

Plant frond-like, attached to stones, about 1 in. diam. *Leaves* simple, sometimes forked or lacerate, $\frac{1}{12}$ in. long, mixed with papillæ. *Sheath* bristling with rigid teeth (tips of connate leaves). *Pedicel* equalling the flower, at length elongate and $\frac{1}{4}$ in. long. *Perianth* oblong. *Stamens* included. *Capsule* ellipsoid, subsessile, 9-ribbed, crowned with 3 recurved stigmas.

2. **T. pulchella,** *Tul. Monogr. Podost.* 192, t. 13, f. 4; plant minute narrow flat lobed, leaves distichous short linear acute, sheath cylindric of slender connate leaves mouth ciliate. *Wedd. in D.C. Prodr.* xvii. 46. Lawia pulchella, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 113. Mnianthus pulchellus, *Walp. Ann.* iii. 443.

The CONCAN; near Bombay.

Plant frond-like, $\frac{1}{6}$–$\frac{1}{3}$ in. diam.; lobes very short, terminated by buds. *Leaves* $\frac{1}{6}$ in.

long, with a white mesial line, upper shorter. *Pedicel* about as long as the leaves. *Perianth* obtusely 3-lobed. *Capsule* obovoid, crowned with 3 short stigmas.

3. **T. Lawii,** *Wedd. in DC. Prodr.* xvii. 47; plant very minute flat, leaves sublanceolate crowded round the base of the sheath which is formed of connate leaves with free recurved tips, pedicel very short. Tulasnea Lawii, *Wight Ic.* t. 1919, f. 3. Dalzellia Lawii, *Wight l. c.* 35.

The CONCAN; in the Salset River, *Law.*

Plant about 1/8 in. diam. *Flowering buds* crowded round the margins of the frond. *Perianth-segments* obtuse. *Capsule* ellipsoid, obscurely ribbed.

4. **T. longipes,** *Tul. Monogr. Podost.* 193, t. 13, f. 2; plant minute, narrow, lobed, leaves crowded round the base of the sheath subdistichous linear-elongate acute longer than the pedicel, sheath broad formed of connate leaves ciliate. *Wedd. in DC. Prodr.* xvii. 47. Lawia longipes, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 113. Mnianthus longipes, *Walp. Ann.* iii. 443.

The CONCAN; in streams near Bombay, *Law.*

Similar to *T. Lawii*; margins of the lobes studded with buds. *Leaves* flat, broad at the base, 1/8–1/3 in. long. *Pedicel* lengthening to 2/3 in.

5. **T. pedunculosa,** *Wedd. in DC. Prodr.* xvii. 47; plant flat lobed, leaves short subulate all connate into a sheath that is much shorter than the pedicel. Dalzellia pedunculosa, *Wight Ic.* 35. Tulasnea pedunculosa, *Wight l. c.* t. 1919, f. 4.

The CONCAN; Bombay, in the Salset River, *Law*; North Canara, *Talbot.*

Probably only a variety of *T. longipes*, as surmised by Weddel, but considered distinct by Wight; the capsule is the same.

6. **T. foliosa,** *Wedd. in DC. Prodr.* xvii. 47; plant broad flat lobed, leaves elongate linear crowded round the base of the pedicel and much shorter than it, none of them connate into a sheath. Dalzellia foliosa, *Wight Ic.* 35. Tulasnea foliosa, *Wight l. c.* t. 1919, f. 2.

The CONCAN; Bombay, in the Salset River, *Law.*

Plant about 1/2 in. broad; margin of lobes studded with buds. *Leaves* numerous in a cluster, 1/4–1/2 in. long, very narrow, flat, very acute, translucent. Pedicel 1/12 in. long.

** *Stems elongate, filiform.*

7. **T. ramosissima,** *Wedd. in DC. Prodr.* xvii. 47; stem filiform very long floating much branched, branches some like the stems, others short and flowering, leaves alternate narrowly linear almost acicular, sheath very short of connate leaves much shorter than the pedicel. Dalzellia ramosissima, *Wight Ic.* 35. Tulasnea ramosissima, *Wight l. c.*

MALABAR; rivers in Cochin, *Johnson.*

A foot or more long; leafy, stems submerged; flowering branches floating, attached to the upper face of the stem and accompanied by two very slender branchlets. *Leaves* on the sterile branches almost acicular, shorter than on the flowering. *Sheath* hardly any, its outer leaves short and very acute. *Pedicel* 1/4–3/8 in. long. *Perianth* 3-lobed almost to the middle. *Filaments* at length exserted; anthers oblong, base sagittate. *Capsule* oblong, narrowed at both ends, 9-ribbed; stigmas slender, suberect.

2. HYDROBRYUM, *Endl.*

Plants small, green, herbaceous, frond-like, spreading over stones, sending up buds clothed at the base with distichous scale-like leaves. *Flowers*

2-sexual, each enclosed in a sessile membranous sheath. *Perianth* 0. *Stamens* 2, filaments united below; staminodes 2, linear. *Ovary* ovoid, 2-celled; stigmas 2, subsessile, broad, flat, spreading, crested or toothed, deciduous. *Capsule* long-pedicelled, ovoid; valves equal 5-ribbed.

H. Griffithii, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104, and *Monogr. Podost.* 141; *Wedd. in DC. Prodr.* xvii. 67. Podostemon Griffithii, *Wall. mss.*; *Griff. in As. Res.* xix. 105, t. 17, and *Ic. Pl. As.* t. 541, f. 2, & t. 544. P. Griffithii, *Gardn. in Calc. Journ. Nat. Hist.* 1850, 40, 41.

KHASIA MTS., on rocks in streams, alt. 2–3000 ft., *Griffith, J. D. H. & T. T.*

Plants consisting of small coriaceous green frond-like lobed patches about 1 in. broad adhering firmly to stones, with buds irregularly scattered over the surface; flowering buds of 6 distichously imbricating leaves about $\frac{1}{12}$ in. long, the lower of which have often filiform tips. *Spathe* about $\frac{1}{10}$ in. long. *Stamens* as long as the ovary; anthers oblong; staminodes with subspathulate tips, appressed to the ovary in bud. *Ovary* subglobose; style very short, stigmas cuneate. *Capsule* oblong-lanceolate, valves delicately ribbed.

3. PODOSTEMON, *Michaux.*

Herbs of various habits. *Pedicels* scattered and adnate to the stem or in terminal or lateral very short branches which are naked or scaly at the base. *Flower* 2-sexual sessile in a little spathe, with 2 linear staminodes at the side of the staminal column. *Stamens* 2, filaments united below. *Ovary* ovoid, 2-celled; styles short linear subulate or ovate acute. *Capsule* long-pedicelled, ovoid, or ellipsoid; valves 3–5-ribbed, persistent or one deciduous. —Species about 20, American, Madagascarian and Indian.

Sect. I. **Dicræa.** *Stems* branched, floating. *Flower-buds* few, lateral on the branches.

1. **P. dichotomus,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 165; stems dichotomously branched compressed floating, flowering branches elongate flexuous, flowers distichously alternate on short leafy branches, sheath of connate leaves the lower of which are scale-like the upper subulate, capsule ellipsoid. Dicræa dichotoma, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 101, and *Monogr. Podost.* 119, t. 9, f. 1.; *Wedd. in DC. Prodr.* xvii. 69.

DECCAN PENINSULA, in streams of the Western Ghats.

P. dichotomus proper; stems slender flexuous and angled. Dicræa dichotoma, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 100, and *Monogr. Podost.* 114; *Wight Ic.* t. 1916, f. 2.—Nilghiri Mts.; in the Pycarrah River, *Wight.*

Var. *Wightii*, Wedd. l. c.; stems and branches shorter broader more flexuous, leaves subulate, flowers more numerous. P. Wightii, *Gardn. l. c.*; *Wight Ic.* t. 196, f. 3. Dicræa Wightii, *Tul. ll. c.*—Nilghiri Mts.; in the Pycarrah River, *Wight.*

Var. *longifolia*, Wedd l. c.; habit of var. *Wightii*; but leaves longer only born on the lower buds. Dicræa longifolia, *Wight l. c.* 1916, f. 4.—Malabar, *Johnson.*

Var. *rigida*, Wedd. l. c.; stems and branches stouter more rigid flowering throughout, leaves all scale-like and connate into a tubular 2-fid sheath. P. rigidus, *Gardn. l. c.* Dicræa rigida, *Tul. ll. c.*; *Wight Ic.* t. 1916, f. 5.—Nilghiri Mts.; in the Pycarrah River, *Wight.*

2. **P. stylosus,** *Benth. in Gen. Pl.* iii. 112; stems very long branched compressed margins floriferous, leaves 4 distichously imbricate inner obtuse subcuspidate sheathing the spathe, stigmas pubescent equalling or exceeding

the ovary, capsule 6-ribbed. Dicræa stylosa, *Wight Ic.* t. 1917, f. 2; *Wedd. in DC. Prodr.* xvii. 70.

MALABAR; in mountain streams, near Calicut, *Johnson.* TRAVANCORE; in streams of the Anamallay Hills, *Wight.*

The long stigmas distinguish this species.

3. **P. elongatus,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 188; stems long filiform subsimple terete floating below and branches flowering, tips elongate leafy flowerless, leaves acicular, flowers distichous in spikes or racemes terminating short branches, capsule ellipsoid. Dicræa elongata, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 102, and *Monogr. Podost.* 124, t. 9, f. 2; *Wight Ic.* t. 1917, f. 1; *Wedd. in DC. Prodr.* xvii. 70.

CEYLON; in the Mahawalle Gunga River, below Peradenyia, *Gardner.*

Stems tufted, 1–2 in., clothed with distichous buds; upper buds flowerless, consisting of clusters of linear or subspathulate leaves ⅛–¼ in. long.; lower buds of boat-shaped acute keeled leaves connate at the base and enclosing the flower. *Spathe* funnel-shaped, mouth 2-fid. *Filament* stout, equalling the ovary and subulate staminodes; anthers oblong. *Capsule* sessile on the fruiting pedicels, which terminate short leafless branches, 8–12-ribbed; stigmas ovate, acute.

4. **P. algæformis,** *Benth. in Gen. Plant.* iii. 112; stems long compressed floating simply or dichotomously branched from the base, branches strap-shaped simple or forked obtuse, flowers on the margins of the stem below or branches, pedicel with minute leaves at the base, of which the inner are large and concave, capsule elliptic-oblong 8-ribbed. Dicræa algæformis, *Beddome in Trans. Linn. Soc.* xxv: 223, t. 24; *Wedd. in DC. Prodr.* xvii. 70; *Warm. in Videlsk. Selsk. Skr.* vi. 2, t. 12; *Trim. in Journ. Bot.* xxiii. (1855) 173.

TRAVANCORE; on rocks in streams of the Anamallay Mts., *Beddome.* CEYLON; near Kandy, *Trimen.*

Stems tufted, dark green, ¾ in., like a *Fucus*; branches unequal, alternate or clustered. *Spathe* with a dilated 2–3-fid mouth. *Staminodes* 2–3, subulate, as long as the ovary. *Filaments* connate below; anthers oblong. *Stigmas* subulate.—Mr. Hemsley, who has examined the Ceylon specimens, regards them as intermediate between *P. algæformis* and *Wallichii.*

5. **P. subulatus,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 184; stem short simple or dichotomous, branches short leafy, leaves amplexicaul distichous elongate-subulate, pedicels short, stigmas subulate-lanceolate. *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 103, and *Monogr. Podost.* 135, t. 9, f. 4; *Wedd. in DC. Prodr.* xvii. 74; *Wight Ic.* t. 1918, f. 1; *Thwaites Enum.* 222. P. dendroides, *Thw. mss.*

CEYLON; on rocks in the Mahawalle Gunga River, near Holnicut.

Stems stout, rough, 1–1½ in., attached to stones by a small fleshy depressed rootstock. *Leaves* 1–2½ in., base very broad, with rarely a short stipule on the margin of the sheath. *Spathe* broadly tubular, 2–4-lobed unequally. *Filament* much longer than the ovary; staminodes shorter, narrowly linear. *Capsule* ellipsoid, usually long-peduncled; valves 8-ribbed, one falling before the other.

Sect. II. **Polypleurum.** *Stem* flat dilated frond-like. *Flower-buds* scattered or submarginal, with few scales.

6. **P. Hookerianus,** *Wedd. in DC. Prodr.* xvii. 74; plant an irregularly dilated thickish sinuate or lobulate frond with marginal 1-fid. buds of about 6 distichously imbricate ovate obtuse or acuminate leaves, capsule

smooth. Mniopsis Hookeriana, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104, and *Monogr. Podost.* 147, t. 8, f. 5; *Wight Ic.* t. 1918, f. 4.

The CONCAN; near Bombay, in streams, *Law.* N. CANARA, in the Kala nuddi, *Talbot.*

Plant 1–2 in. broad, appressed to rocks, &c. *Leaves* not keeled, lower short obtuse, upper $\frac{1}{8}$ in. long. *Spathe* tubular, mouth 2-lobed. *Pedicel* about $\frac{1}{8}$ in. *Filament* flat; staminodes linear, acute, shorter than the ovary. *Ovary* sessile, globose; stigmas long, subulate-lanceolate. *Capsule* subglobose, one valve falling away before the other.—Mr. Hemsley regards the Canara specimens as intermediate between *P. stylosus* and *algæformis.*

7. **P. Johnsonii,** *Wedd. in DC. Prodr.* xvii. 75; plant an irregularly dilated membranous suborbicular or lobed frond, buds on the upper surface 1-fld. of 4–6 distichously imbricate ovate obtuse keeled leaves, capsule smooth or with 8 confluent broad ribs. Mniopsis Johnsonii, *Wight Ic.* t. 1919, f. 5.

MALABAR; in rivers, *Johnson.*

Plant 1–$1\frac{1}{4}$ in. broad, appressed to the stones, &c. *Leaves* $\frac{1}{12}$ in., spreading, rigid when dry, upper rather the longest. *Spathe* ovoid, subcompressed, split ventrally and at the tip. *Filament* longer than the ovary; anthers ovate; staminodes very narrow, incurved above, equalling the ovary. *Ovary* globose, sessile; stigmas short, linear. *Capsule* ellipsoid.

8. **P. olivaceus,** *Gardn. in Calc. Journ. Nat. Hist.* 181; plant a membranous irregularly lobed flat frond, buds crowded on its upper surface 1-fld. of 6 equitant oblong obtuse acutely keeled leaves, capsule with 8 thick ribs. *Wedd. in DC. Prodr.* xvii. 75. P. griseus, *Gardn. l. c.* Hydrobryum olivaceum & griseum, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 104 and *Monogr. Podost.* 138, 140, t. 9; *Wight Ic.* t. 1918, f. 2. ? P. Gardneri, *Harv. mss.*; *Thwaites Enum.* 223.

NILGHIRI MTS.; in the Pycarrah River, *Wight.* CEYLON; in the Mahawalle Gunga River, *Gardner,* &c.

Plant about 1 in. broad, appressed to rocks, &c., its lobes sometimes imbricating. *Leaves* $\frac{1}{12}$ in., upper larger. *Spathe* elliptic-oblong, incumbent on the frond, at length split longitudinally. *Pedicel* at length $\frac{1}{8}$ in. long. *Filament* compressed, arms short, anthers ovate; staminodes linear, shorter than the ovary. *Ovary* sessile; stigmas short, triangular-lanceolate. *Capsule* ellipsoid, ribs of the persistent valve decurrent on the pedicel.—*P. Gardneri,* which consists of a simple terete stem crowned with capillary leaves, and grows on the rootstock of *P. olivaceus,* is supposed to be an abnormal foliaceous development of that plant.

9. **P. acuminatus,** *Wedd. in DC. Prodr.* xvii. 75; plant a flat frond radiately lobed, buds in the sinus and angles between the lobes 1-fld. of 6 equitant leaves terminating in long subulate caducous points, capsule broadly 8-ribbed.

KHASIA MTS., in the Bogapane and Kalapane Rivers, *J. D. H. & T. T.*

Plant minute, membranous, subdichotomously irregularly shortly forked or lobed and toothed. *Buds* horizontal; lower leaves shorter, obtuse. *Spathe* ellipsoid, narrowed below, at length split longitudinally. *Pedicel* ascending, $\frac{1}{10}$ in. *Filament* flattened, arms short, spreading, staminodes linear, half as long as the ovary. *Stigmas* subulate-lanceolate. *Capsule* obliquely ellipsoid, ribs of the persistent valve decurrent on the pedicel.

10. **P. microcarpus,** *Wedd. in DC. Prodr.* xvii. 76; plant a dichotomous flat branching frond bearing scattered 1-fld. buds of 6–8 equitant subacute compressed keeled leaves, spathe boat-shaped, capsule obovoid

ellipsoid not ribbed. Hydrobryum lichenoides, *Kurz in Journ. As. Soc. Beng.* xlii. 2. 103.

TENASSERIM; on branches of shrubs near waterfalls at Tavoy and Moulmein, *Parish.*

Plant 1-2 in. broad, adhering to bark, irregularly or subradiately spreading. *Leaves* 1/12 in. long, upper largest. *Spathe* open, rather shorter than the pedicel. *Stamens* unknown.—I have seen no specimen of Kurz's *Hydrobryum lichenoides*, of which the description is very meagre; as, however, he states it to have been received from Parish and collected in Burma, there is little room to doubt its identity. Weddel describes the plant as not ribbed, Kurz as broadly 3-ribbed.

11. **P. Wallichii,** *Br. in Wall. Cat.* 5225; plant a minute flat veined lobulate frond, buds on the edges of the lobes 1-fld. continuous with the veins, of 5–7 scale-like subdistichous fleshy at length deciduous leaves, spathe tubular, capsule 8-ribbed. *Griff. in As. Research.* xix. 103, t. 17, and *Notul.* 378, and *Ic. Pl. Asiat.* t. 541, f. 1, 542, 543; *Gardn. in Calc. Journ. Nat. Hist.* 183; *Royle Ill.* i. 331. Dicræa Wallichii, *Tul. in Ann. Sc. Nat. Ser.* 3, xi. 101, and *Monogr. Podost.* 118; *Wight Ic.* t. 1916, f. 1; *Meissn. in DC. Prodr.* xvii. 70. Lacis Wallichii, *Steud. Nomencl.* Polypleurum orientale, *Tayl. mss.* Blandovia striata, *Lehm. mss.*

KHASIA MTS., *Wallich*; at the falls near Churra, *Griffith.* AVA; at Cheppedong, *Wallich.*

Plant ascending, about 1 in. long, veins radiating. *Buds* usually from between the lobes, rarely superficial. *Leaves* irregularly disposed, more or less connate. *Pedicel* 1/3–3/8 in. *Spathe* dilated at the mouth, invaginate about the middle. *Filament* subterete; anthers broadly ovate; staminodes 2 or with a third arising from the fork of the filament. *Ovary* ovoid; stigmas thick, subulate, unequal, divaricate. *Capsule* narrowed into the pedicel; valves persistent, incurved.

12. **P. pterophyllus,** *Benth. in Gen. Pl.* iii. 112; plant a very small flat-veined lobed frond, lobes entire or forked, buds arising from the veins at about the middle of the frond of 4–6 distichous leaves with winged keels, capsule ellipsoid 8–12-ribbed. Dicræa pterophylla, *Wedd. in DC. Prodr.* xvii. 71.

KHASIA MTS.; in rivulets, *J. D. H.*

Plant variable in form, appressed; veins radiating from the centre; lobes or segments short or sometimes 1¼ in. long. Upper *leaves* the longest, about 1/12 in. long, keel dilated into an oblong wing. *Pedicels* ¼–½ in. *Stigmas* (imperfect) ovate or ovate-lanceolate. *Capsule* about 1/16 in.

13. **P. minor,** *Benth. in Gen. Pl.* iii. 112; plant a minute stellately lobed flat veinless frond, lobes narrow simple or subdichotomously branched, buds on the margins and upper surface of the fronds leafless, spathe enclosed in a very obliquely funnel-shaped sheath, capsule ellipsoid 10-ribbed. Dicræa minor, *Wedd. in DC. Prodr.* xvii. 71.

KHASIA MTS.; *Griffith.*

Plant fragmentary, fragments 1¼ in. long and less, very narrow, olive-brown when dry. *Sheath* split to the base on one side, margin waved or lobed, fleshy; spathe seated in the sheath, tubular, mouth 2-lobed, longer than the pedicel. *Filament* equalling the capsule; anthers ovate; staminodes very slender, half as long as the filament. *Capsule* sessile, subacute, dorsal nerve acute; stigmas linear, acute.

Sect. III. **Selaginoides.** *Stems* of two forms, flowering densely fascicled, elongate, clothed with imbricating tetrastichous thick scales; leaves of the flowerless stem with very long filiform tips.

14. **P. selaginoides,** *Benth. in Gen. Pl.* iii. 113; stems densely tufted simple erect the flowerless naked below, flowering densely clothed from the base with 4-ranked imbricating scales, flowers terminal subsessile, capsule ellipsoid smooth. Mniopsis selaginoides, *Beddome in Trans. Linn. Soc.* xxv. 223, t. 28. Dicræa selaginoides, *Wedd. in DC. Prodr.* xvii. 68.

SOUTH DECCAN; in streams of the Anamallay Hills, *Wight, Beddome.*

Rootstock small, depressed, stems 2–3 in. rather fleshy. *Leaves* of the flowerless stems ⅛–½ in. long, semiterete below then strap-shaped, those of the flowering stems subclavate, the upper 1/10 in., lower shorter, keeled at the back, channelled in front; filiform tips jointed at the base and deciduous. *Spathe* amongst the upper leaves, saccate, mouth 2-lobed. *Ovary* ellipsoid, obtuse, stigmas unequal. *Filament* equalling the ovary, anthers oblong; staminodes narrowly linear. *Capsule* ⅛ in. long.

DOUBTFUL SPECIES.

DICRÆA APICATA, *Tul. Monogr. Podost.* 204; *Wedd. in DC. Prodr.* xvii. 71; stems 2–3 in. compressed simple naked crowned with a brush of filiform branchlets, flowers as in *P. dichotomus.*—Nilghiri Mts., *Wight;* in streams at Pycarrah, *Gardner.* ? Ceylon, *Thwaites* (C. P. 2989). Probably (according to Tulasne) an abnormal form of *P. dichotomus* var. *rigida.*

ORDER CXXI. NEPENTHACEÆ.

Climbing or prostrate evergreen undershrubs. *Leaves* alternate, exstipulate; midrib stout, produced into a peduncle which bears a pitcher of various forms, nerves parallel; pitcher with 2 longitudinal ribs or wings in front, at first closed by a lid which opens and becomes erect or reflected, inner surface covered below the middle with glands that secrete water; mouth with a revolute and closely ribbed margin (*peristome*). *Inflorescence* terminal or lateral; flowers racemose rarely panicled, diœcious, small, green or brownish. *Perianth* 4-, rarely 3-partite; segments oblong, glandular within. MALE FL. *Stamens* 4–16, united in a column crowned by the usually connate anthers with extrorse dehiscence. FEMALE FL. *Ovary* superior, 4- rarely 3-gonous, 4–3-celled; stigma sessile, discoid, 4–3-lobed. *Ovules* numerous, in many series, attached to the septa, anatropous, ascending. *Capsule* coriaceous, loculicidally 4–3-valved. *Seeds* very numerous, minute, imbricate, testa membranous, produced into a thread at each end; albumen fleshy; embryo axile, straight, cotyledons linear, radicle short inferior.—Genus 1, species about 30, Tropical Asia, Malay Islands, N. Australia, New Caledonia, Madagascar and the Seychelles.

NEPENTHES, *Linn.*

Character of the Order.

* *Flowers panicled.*

1. **N. distillatoria,** *Linn.*; *Hook. f. in DC. Prodr.* xvii. 93; glabrous, leaves elliptic-lanceolate, petiole broadly winged ½-amplexicaul, pitcher cylindric hardly inflated below, mouth subcordate, ribs not winged, peristome narrow not dilated behind, lid smooth within. *Burm. Fl. Ind.* 190; *Gærtn. Fruct.* ii. 18, t. 33; *Thwaites Enum.* 290. N. indica, *Poir. Encycl.* iv. 458; *Brongn. in Ann. Sc. Nat.* i. 43, t. 5, f. 1. Bandura zeylanica, *Burm. Thes. Zeyl.* 42, t. 17.

CEYLON; south of the island, common.

A tall climber. *Leaves* 5–12 by 1–2½ in., coriaceous, acute or acuminate. *Pitchers*

4–6 in. long; peristome very narrow; lid orbicular. *Panicle* 8–12 in., puberulous. *Flowers* ¼ in. diam.

** *Flowers in a raceme with at its base short branches with scorpioid inflorescence.*

2. **N. ampullaria,** *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 271; stem stout rusty-pubescent, leaves elliptic- or obovate-lanceolate or obcuneate pubescent beneath narrowed into a short winged ½-amplexicaul petiole, lower pitchers fascicled globose leafless, upper saccate, wings fimbriate, peristome broad and deep, lid linear reflexed, peduncle short and inflorescence rusty-tomentose. *Hook. f. in DC. Prodr.* xvii. 93; *Lambert, Pinus II. App.* t. 8; *Korth. Verh. Nat. Gesch.* 39, t. 13; *Hook. Bot. Mag.* t. 5109. N. ampullacea, *Blume Mus. Bot.* ii. 9; *Wall. Cat.* 2243 A, *in part.*

SINGAPORE, *Jack.* MALACCA, *Cuming, Griffith.*—DISTRIB. Sumatra, Borneo.

Stem prostrate below, with a whorl of many short pitchers, above erect. *Leaves* 3–12 by 1–4 in., nerves 2–4 on each side. *Pitchers* green, purple-spotted. lower 1–2 in. diam., upper cylindric cup-shaped or hemispheric, often gibbous or inflated in front; mouth orbicular; throat glandular to the top; peristome forming a deep curtain in the pitcher; lid very much smaller than the mouth, eglandular, *Racemes* 4–10 in., dense-fld. *Flowers* ⅓–½ in. diam. *Capsule* 1–1½ in.

*** *Flowers simply racemose; pedicels rarely 2-fld.*

3. **N. Rafflesiana,** *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 270; stem stout cylindric, lower leaves lanceolate upper oblong to linear-lanceolate, petiole long ½-amplexicaul, lower pitchers ventricose below, wings fimbriate upper funnel-shaped not winged, neck elongate, peristome convex dilated and pectinate posteriorly, lid smooth within. *Wall. Cat.* 2242, 2243 A, *in part*; *Hook. f. in DC. Prodr.* xvii. 96; *Hook. Bot. Mag.* t. 4285; *Fl. des Serres*, t. 213, 214; *Korth. in Ann. de Gand.* iii. 7, t. 105; *De Vriese Tuinbouw Flor.* i. 208, t. 5. N. Hookeri, *Alphand Prom. de Paris, cum Ic.*

SINGAPORE, *Jack,* &c.—DISTRIB. Sumatra, Borneo.

Stem long, stout, and young leaves thinly woolly. *Leaves* 4–18 in., lower membranous; petiole 3–8 in. *Pitchers* puberulous, peduncle stout, lower 3–4 in. diam., greenish yellow blotched with purple, mouth oblique contracted; peristome ½ in. broad; upper pitchers 6–12 in. long; wings narrow, ciliate or not; lid with large glands. *Racemes* 6–10 in., white and woolly, dense-fld.; flowers ⅓ in. diam. *Capsule* 1–1½ in.—Varies from glabrous to white-woolly.

4. **N. phyllamphora,** *Willd. Sp. Pl.* iv. 2. 874; stem cylindric, leaves elliptic-oblong or lanceolate young denticulate and ciliate, petiole long ½-amplexicaul, pitchers subcylindric, peristome narrow, lid oblong or orbicular, racemes pubescent, pedicels slender. *Wall. Cat.* 2214; *Brongn. in Ann. Sc. Nat.* i. 458; *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 271; *Korthals in Verh. Nat. Gesch.* 28, t. 15; *Hook. f. in DC. Prodr.* xvii. 97. N. fimbriata & macrostachya, *Blume l. c.*; *Miquel Ill. Fl. Ins. Archip.* 3. t. 2, and 5. t. 6. Phyllamphora mirabilis, *Lour. Fl. Coch.* 606.—*Rumph. Herb. Amboin.* v. t. 121.

SINGAPORE, *Wallich*; MALACCA, on Mt. Ophir, *Lobb.*—DISTRIB. Malay Archipelago, China, New Guinea.

Stem short, creeping and climbing. *Leaves* 4–18 in., young puberulous, nerves many; petiole 1½–5 in. *Pitchers* 4–6 in. long, narrowed at the base, not winged: peristome ⅛–⅓ in. diam., lid densely glandular within. *Racemes* slender, mealy and hairy; flowers ⅓–⅝ in. diam. *Capsule* ⅓–⅔ in. long.

5. **N. sanguinea,** *Lindl. in Gard. Chron.* 1849, 580, with wood-cut; stem stout 3-gonous, leaves sessile obovate-oblong or cuneate cordately amplexicaul, pitchers large young short ventricose below narrowly 2-winged, old cylindric narrowed below, peristome broad dilated posteriorly, lid densely glandular within, racemes lax-fld., pedicels long capillary. *Hook. f. in DC. Prodr.* xvii. 100. N. sanguinea, *Griff. Posth. Papers*, iv. 348.

MALACCA; at Goonong Ledang, *Griffith*; Mt. Ophir, *Lobb*.

Often epiphytic; branches short, stout. *Leaves* with imbricating bases; nerves 2–3 hairs, obscure. *Pitchers* 12 by 2½–3½ in., blood-red, scurfy; mouth broad, ovate, produced behind; peristome ½–¾ in. broad, inner margin inflexed; lid membranous. *Racemes* pubescent, male a foot long, female shorter; pedicels 1–1½ in.; flowers small, ¼–½ in. diam.

6. **N. khasiana,** *Hook. f. in DC. Prodr.* xvii. 102; stem cylindric, leaves sessile amplexicaul lanceolate base shortly decurrent penninerved, pitchers large subcylindric inflated below, mouth contracted, peristome broad, racemes robust puberulous, pedicels short. N. distillatoria, *Wall. Cat.* 2244, *in part*; *Grdh. in Bot. Mag.* t. 2798. N. phyllamphora, *Herb. Ind. Or. H. f. & T.*

KHASIA and JYNTEA MTS., *Wallich*, &c.

Stem short, stout, elongate under cultivation, prostrate, leafy. *Leaves* 1–2 ft. by 1½–3½ in., acute or acuminate, base narrowed, nerves numerous. *Pitchers* 4–7 by 1½–3 in., membranous, glabrous, green, reddish above, young shortly winged; mouth orbicular; peristome cylindric; lid membranous. *Racemes* lateral and terminal, puberulous; pedicels ⅓ in.; flowers ⅓ in. diam., green. *Capsule* ¾–1 in. long.—A specimen of this in Herb. Wallich is marked as from "Courtallam, *Herb. Heyne*," but has never been found there by any subsequent collector, and it is inconceivable that the natives should not know so remarkable a plant.

7. **N. albo-marginata,** *Lobb ex Lindl. in Gard. Chron.* 1849, 580, with wood-cut; stem subcylindric and racemes and pitchers hoary-pubescent, leaves subsessile with a shortly decurrent ½-amplexicaul base elliptic-lanceolate acuminate, pitchers cylindric or funnel-shaped, or younger ventricose below, with a white velvety band on the neck, peristome narrow, lid orbicular glandular within, racemes long, pedicels very slender. *Hook. f in Trans. Linn. Soc.* xxii. 422, t. 73, and in *DC. Prodr.* xvii. 102. N tomentella, *Miquel Fl. Ind. Bat,* i. pt. 1, 1075, and *Ill. Fl. Ins. Archip.* v. t. 5. N. distillatoria, *Wall. Cat.* 2244, *in part*.

SINGAPORE, *Wallich*.—DISTRIB. Borneo.

Hoary-pubescent. *Stem* elongate, subtomentose or subsilky. *Leaves* 8–14 b ½-1½ in.; nerves 1–2 on each side, slender. *Pitchers* 3–5 by 1½ in., green purpl or mottled with purple and red, stellately downy, lower ventricose below with fimbriat wings, upper narrower. *Racemes* elongate, lax-fld.; pedicels ¾–1 in.; flowers ¼–½ in diam. *Capsule* 1½–2 in.

8. **N. Reinwardtiana,** *Miquel in Plant. Jungh.* i. 168, and *Fl. Ind Bat.* i. pt. 1, 1075, and *Illust. Pl. Ins. Archip.* 4, t. 4; stem glabrou obtusely 3-gonous, 2–3-winged above, leaves sessile ½-amplexicaul linear lanceolate acuminate shortly decurrent glabrous, pitchers subcylindri inflated below glabrous, mouth dilated produced posteriorly, peristom narrow smooth, lid densely glandular within, racemes downy lax-fld pedicels slender. *Hook. f. in DC. Prodr.* xvii. 103. N. distillatoria, *Wal Cat.* 2244, *in part.*

SINGAPORE, *Wallich*.—DISTRIB. Sumatra, Borneo.

Stem subcylindric below, winged above by the decurrent leaf bases. *Leaves* 5-1 by ¾-1 in., lower long acuminate, upper shorter often obtuse, nerves 3-4 on each side. *Pitchers* 4-8 in., violet; mouth 2-2½ in. wide; peristome very obscurely if at all striate. *Racemes* 5-7 in. long; female shorter, tomentose; pedicels ½-1 in.; flowers small, ¼-⅓ in. diam. *Capsule* ½-¾ in.—Differs from *N. gracilis* in the glandular lid and smooth peristome.

9. **N. gracilis,** *Korthals in Verh. Nat. Gesch.* xxii. t. 1 and 4, f. 1-38; stem glabrous 3-4-angled, leaves sessile linear-lanceolate decurrent, pitchers cylindric inflated below, contracted in the middle, mouth orbicular, peristome very narrow ribbed, lid orbicular with few glands within, racemes narrow downy, pedicels short. *Hook. f. in DC. Prodr.* xvii. 104; *Blume Mus. Bot.* ii. 10; *Miquel Fl. Ind. Bat.* i. pt. 1, 1071; *Spach Suites à Buffon Veg. Phan.* t. 144. N. Korthalsiana, *Miquel l. c.* 1071, and *Fl. Ins. Archip.* 7, t. 1. N. lævis, *Korth., in part.*

MALACCA and SINGAPORE; *Jack, Wallich.*—DISTRIB. Borneo.

Stem slender, angles obtuse. *Leaves* 4-7 by 1 in., glabrous, coriaceous; nerves 3-5 pairs, conspicuous. *Pitchers* 2½-4 in. long, glabrous, membranous, lower winged; mouth rather dilated; peristome very narrow or almost filiform; glands of lid very few and large. *Racemes* tomentose or glabrate, pedicels ⅙-¼ in. *Flowers* ⅙-⅓ in. broad. *Capsule* slender, ¾-1½ in. long, glabrous.

ORDER CXXII. **CYTINACEÆ.**

Leafless brown reddish or yellowish parasites, or with leaves reduced to scales. *Flowers* solitary or in a spadix-like spike, or clustered on the root or branch of the host. *Perianth* superior, 3-10-cleft, segments or lobes imbricate or valvate. *Stamens* 8 or more, forming a fleshy ring round the style, or inserted on the perianth, 2-celled, bursting by pores or slits. *Ovary* 1-celled, or with many spurious cells formed of branching fleshy pendulous or parietal placentas; stigmas various. *Ovules* excessively numerous, orthotropous or anatropous. *Fruit* fleshy, 1-celled. *Seeds* innumerable, very minute, sometimes sunk in the placentas, nucleus homogeneous, or albumen cellular with a most minute embryo.—Genera 7, species 22, mostly tropical.

1. **SAPRIA,** *Griff.*

Plant diœcious, consisting of a solitary large flower sessile in a cup formed of the bark of a vine-stem, surrounded at the base by large broad opposite imbricating bracts. MALE FL. *Perianth-tube* hemispheric and solid below, cupular above and marked with 20 radiating ridges; limb 10-partite, segments rounded or oblong imbricate in two rows, spreading; from the base of the tube rises a stout columnar style crowned with a broad cup-shaped very hairy disk. *Anthers* about 20, sessile in a ring under the disk, subglobose, 2-3-celled, opening outwards by one pore. FEM. FL. *Perianth* of the male. *Ovary* traversed by longitudinal sinuous cells the walls of which are covered with anatropous ovules; stigma, a papillose cone in the centre of the disk. *Fruit* the swollen globose ovary crowned with the perianth.

S. himalayana, *Griff. in Proc. Linn. Soc.* i. 216, and in *Trans. Linn. Soc.* xix. 314, t. 34, 35; *Hook. f. in DC. Prodr.* xvii. 112. S. Griffithii, *Brown in Trans. Linn. Soc.* xix. 244.

EASTERN ASSAM; in the Mishmi Hills, on the roots of a vine, alt. 3-5000 ft., *Griffith.*

Buds globose; bracts white and pink. *Flowers* fœtid, 5–6 in. diam., tube blood-red within; segments fleshy, warted; ring at throat clothed with filiform processes; disk of column rosy.

ORDER CXXIII. **ARISTOLOCHIACEÆ.**

Herbs or shrubs, often climbing. *Leaves* alternate, entire or 3–5-lobed, exstipulate. *Flowers* 2-sexual, often large, usually lurid, terminal axillary or lateral, solitary racemose or cymose, bracteate or not. *Perianth* superior, regular or irregular, 3-lobed or tubular and variously shaped, lobes valvate. *Stamens* 6 or more, subsessile in a ring round the base of the style, cells parallel opening by dorsal slits. *Ovary* 4–6-celled, placentas parietal, free or meeting in the axis; style columnar, stigma lobed; ovules numerous, anatropous. *Fruit* capsular or baccate. *Seeds* numerous, various, albumen copious fleshy; embryo minute.—Genera 5, species about 200, chiefly tropical.

Perianth short, regular, 3-lobed. Ovary very short	1. ASARUM.
Perianth short, regular. Stamens 1-seriate. Ovary linear . .	2. BRAGANTIA.
Perianth regular. Stamens 2-seriate. Ovary linear	3. THOTTEA.
Perianth tubular with an inflated base, irregular	4. ARISTOLOCHIA.

1. **ASARUM,** *Linn.*

Perennial herbs; rootstock stout, woody. *Leaves* radical. *Flowers* solitary, terminal, peduncled, purple. *Perianth* shortly campanulate, regular, persistent, 3-lobed. *Stamens* 12, connective produced. *Ovary* inferior or ½-inferior, 6-celled; styles 6, tubular, grooved or 2-fid. *Fruit* coriaceous, bursting irregularly. *Seeds* boat-shaped, convex face wrinkled, opposite face winged or with a fleshy raphe.—Species 13, N. temperate hemisphere.

A. himalaicum, *Hook. f. & Thoms. mss.*; *Duchartre in DC. Prodr.* xv. 1. 424; leaves long-petioled rounded-ovate deeply cordate finely acuminate. *Klotzsch in Monatsb. Berl. Akad.* 1859, 385; *Braun Ind. Sem. Hort. Berol. App.* 1861, 12.

SIKKIM HIMALAYA; alt. 9–11,000 ft., *J. D. H.*

Rootstock slender. *Leaves* 3–4 in. diam., membranous; petiole 4–8 in., slender. *Peduncle* 1–2 in. *Perianth* broadly campanulate, lurid purple, ¾ in. diam., puberulous, lobes triangular. *Connective* with a subulate tip.—Belongs to the section *Euasarum* with a European and N.W. American species.

2. **BRAGANTIA,** *Lour.*

Shrubs or undershrubs; hairs stellate. *Leaves* petioled, 3–5-nerved; veins closely reticulate beneath. *Flowers* axillary or subradical, cymose, bracteate. *Perianth* shortly campanulate, equally 3-lobed, deciduous. *Stamens* 6–12, 1-seriate, free or connate, connective thick. *Ovary* elongate, 4-celled; style short, stigmas 3 or more linear; ovules 2-seriate. *Capsule* elongate, 4-gonous, septicidally 4-valved, valves separating from a placentiferous column. *Seeds* oblong, 3-gonous, rugose or deeply pitted, often coated with remains of the placenta.—Species 4 or 5, Malayan and Indian.

* *First pair of basal nerves reaching far beyond the middle of the leaf. Cymes axillary. Stamens 9–12.*

1. **B. corymbosa,** *Griff. in Trans. Linn. Soc.* xix. 335; shrubby, branches leaves beneath and inflorescence finely puberulous, leaves distichous oblong-ovate acuminate glabrous above, flowers in cymose spikes, perianth-tube 0, segments cordate acute, anthers 8–10, stigma discoid. *Duchartre in DC. Prodr.* xv. 1. 429. B. melastomæfolia, *Duchartre l. c.* Asiphonia piperiformis, *Griff. l. c.* 333, t. 37, and *Notul.* 344, and *Ic. Pl. Asiat.* t. 528; *Ann. Sc. Nat. Ser.* 3, vii. 338. Strakæa melastomæfolia, *Presl Epimel. Bot.* 221.

MALACCA, *Griffith, Lobb, Cuming.*

Branches slender, terete. *Leaves* 5–6 by 2–2½ in., shining above; petiole very short, base rounded. *Cymes* much shorter than the leaves; spikes peduncled, divaricate. *Flowers* ¼ in. diam. *Capsule* 1 foot long, torulose. *Seeds* ⅛–¼ in. long, lanceolate, 3-gonous, rugose.

2. **B. Wallichii,** *Br. in Wall. Cat.* 7415; shrubby, branches and leaves beneath finely pubescent or glabrate tips and inflorescence tomentose, leaves oblong-lanceolate glabrous above, flowers in small irregular few-fld. cymes not spicate, perianth hemispheric, segments broadly ovate. *Duchart. in DC. Prodr.* xv. 1. 430; *Wight Ic.* t. 520; *Wight & Arn. in Ed. Phil. Journ.* 1833, 181; *Dalz. & Gibs. Bomb. Fl.* 225. B. siliquosa, *Miq. Pl. Ind. Or. Hohenack.* n. 64. Apama siliquosa, *Lamk. Encycl.* i. 91, and *Ill.* t. 640. Trimeriza piperina, *Lindl. in Bot. Reg. under* t. 1543. —*Rheede Hort. Mal.* vi. t. 28.

DECCAN PENINSULA; in the western forests, from the Southern Concan southwards. CEYLON; ascending to 4000 ft.

Branches angled. *Leaves* 5–8 by 1½–2 in., base acute or rounded. *Cymes* ½–1 in. long, rarely longer. *Flowers* 1 in. diam. *Capsule* 3–4 in., straight. *Seeds* 1/10 in. long, 3-gonous, deeply pitted.

Var. *brachycarpa*; leaves ovate-oblong or oblong acuminate finely puberulous beneath, flowers in cymose spikes, capsule 2½ in. B. brachycarpa, *Thwaites mss.*

Var. *latifolia*, Duchart. l. c.; leaves larger broader obovate-oblong tomentose beneath. B. hispida, *Thwaites mss.*

3. **B. Dalzellii,** *Hook. f.*; shrubby, stout, leaves very large oblong-lanceolate acuminate finely puberulous beneath, capsules 5–8 in. long torulose, seeds ¼ in. long 3-gonous rugose and deeply pitted.

The CONCAN? *Herb. N. A. Dalzell.*

A very fine species with leaves a foot long by 3 in. broad, and very long pods and large seeds. From the remains of the inflorescence its branches do not appear to have been spicate. Seeds lemon-yellow.

** *First pair of basal nerves not reaching the middle of the leaf. Cymes from the base of the stem. Stamens* 6.

4. **B. tomentosa,** *Blume Enum. Pl. Jav.* 82; herbaceous, low, stem simple and leaves beneath densely tomentose, leaves 1–8 oblong or ovate cordate, flowers in simple spikes. *Duchart. in DC. Prodr.* xv. 1. 431; *Bennett Plant. Jav. Rar.* 43, t. 11; *Griff. in Trans. Linn. Soc.* xix. 335; *Miquel Fl. Ind. Bat.* B. khasiana, *Griff. l. c.* B. latifolia, *Lindl. in Bot. Reg. under* t. 1543. Bragantia, n. sp., *Br. in Trans. Linn. Soc.* xiii. 219. Ceramium tomentosum, *Bl. Bijd.* 1135. Cyclodiscus tomentosus & latifolius, *Klotzsch in Monatsb. Berl. Akad.* 1859, 592. Aristoloch., *Wall. Cat.* 9108.

SILHET, *De Silva*; Moulmein, *Lobb, Parish.*—DISTRIB. Java.

Stem creeping below, and rooting, then ascending, 6–12 in., simple, angular, geniculate, tomentose. *Leaves* 4–6 by 2½–4 in., smooth but opaque above, 6–9-nerved at the base and penninerved beyond. *Flowers* ½–¾ in. diam.; bracts oblong, persistent. *Perianth-lobes* rounded-cordate, acute. *Capsule* 2 in. long, straight. *Seeds* ⅓ in. long, 3-gonous, rugose.

Var. *lanuginosa*; leaves densely woolly beneath.—South Andaman Islands, *Kurz.*

3. THOTTEA, *Rottb.*

Shrubs, erect or straggling. *Leaves* broad, coriaceous, 3–5-nerved. *Flowers* axillary, cymose. *Perianth* broadly campanulate or urceolate, equally 3-lobed, deciduous. *Stamens* numerous, 2-seriate; connective broad. *Ovary* elongate, 4-celled; style broad, stigmas 5–25, radiating; ovules 2-seriate. *Capsule* elongate, 4-gonous, septicidally 4-valved, placentas usually free. *Seeds* oblong, 3-gonous, rugose, coated with remains of the placenta.—Species 5, Malayan.

1. **T. grandiflora,** *Rottb. in Dansk. Vidensk. Selks. Schrift.* ii. 530, t. 2; tomentose, leaves obovate-oblong oblong or elliptic-oblong or -lanceolate acute or acuminate, corolla very large campanulate. *Griff. in Trans. Linn. Soc.* xix. 325, t. 36, and in *Notul.* iv. 346, and *Ic. Pl. Asiat.* t. 530, 531; *Ann. Nat. Hist. Ser.* 3, vii. 328; *Bennett Pl. Jav. Rar.* i. 45; *Klotzsch in Monatsb. Berl. Akad.* 1859, 589; *Duchart. in DC. Prodr.* xv. 1. 428.

MALACCA, *Ringit* (1779), *Griffith, Maingay.* SINGAPORE, *Oxley, Lobb.*—DISTRIB. Borneo?

Branches stout, woody, sometimes villous with spreading hairs. *Leaves* 1–1½ ft. by 6–8 in., coriaceous, basal nerves 3–5; petiole ¼–½ in., stout. *Spikes* 1–2 in., bracts ¼–½ in. *Perianth* attaining 5 in. long and as broad, ribbed, mottled with purple, pubescent outside, arachnoid within. *Style rays* 12–15. *Capsule* 4–6 in., straight or twisted, angles acute, pubescent. *Seeds* ⅛ in. long, 3-gonous, acute at both ends, tubercled.—The doubtful Bornean plant has a rounded leaf 1 foot by 10 in.

2. **T. dependens,** *Klotzsch in Monatsb. Berl. Akad.* 1859, 589; glabrous, leaves lanceolate or elliptic-lanceolate acuminate, corolla urceolate base inflated. *Duchart. in DC. Prodr.* xv. 1. 428. Lobbia dependens, *Planch. in Hook. Lond. Journ. Bot.* vi. (1847) 144, t. 3. Piper arborescens, *Roxb. ex Wall. Cat.* 6648 B.

SINGAPORE; *Wallich, Lobb.*

Branches slender, terete. *Leaves* 6–10 by 2½–3½ in., thinly coriaceous; petiole ⅛ in. *Spikes* simple or cymose, quite glabrous. *Flowers* 1 in. long. *Ovary* 1–1½ in., very slender. *Perianth-base* inflated; tube above it short, cylindric, lobes broader than long.

3. **T. tricornis,** *Maingay mss.*; branches and leaves beneath hoary, leaves elliptic-oblong or oblong-lanceolate or oblanceolate acute or subacute base acute or rounded, cymes short not spicate, perianth depressed acutely 3-angled in bud broadly lanceolate.

MALACCA; *Maingay* (Kew Distrib. 1819).

Branches stout, terete or obtusely angled. *Leaves* 7–9 by 3–4 in., coriaceous; petiole ¼ in. *Cymes* ½–1 in., branched, and perianth densely tomentose. *Flowers* ¾ in. diam., tomentose. *Ovary* short. *Stamens* 12 in 2 rows. *Capsules* 7–8 in. long, downy with brown pubescence, straight or twisted, not torulose. *Seeds* nearly ⅙–⅕ in. long, 3-gonous, tubercled.—This has more the habit of a *Bragantia* than a *Thottea.* The two genera may well be united.

4. ARISTOLOCHIA, *Linn.*

Shrubs or perennial herbs, often twining. *Leaves* entire or lobed;

petiole with a dilated base, and with often the stipule-like leaf of an undeveloped bud in the axil. *Perianth* coloured, tube inflated at the base, then contracted, hairy within; limb dilated, obliquely 1-2-lipped. *Anthers* 6, rarely 5, or more; style very short, 3–6-lobed. *Capsule* septicidally 6-valved or splitting through the placentas. *Seeds* various, often covered with the remains of the placenta.—Species about 180, chiefly tropical.

Sect. I. **Diplolobus,** *Duchart.* *Column* 6-lobed. *Anthers* 6.

1. **A. bracteata,** *Retz. Obs.* v. 29; quite glabrous, stem slender decumbent, leaves reniform or broadly cordate tip obtuse or subacute margins flat or waved glaucous beneath, flowers solitary, peduncle bracteate. *Roxb. Fl. Ind.* iii. 490; *Wall. Pl. As. Rar.* ii. 3, and *Cat.* 2706; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224; *Klotzsch in Monatsb. Berl. Akad.* 1859, 598. A. bractiolata, *Lamk. Encycl.* i. 258; *Klotzsch l. c.* A. mauritiana, *Pers. Encheir.* ii. 527. A. Kotschyi, *Hochst. ex A. Rich Tent. Fl. Abyss.* ii. 237. A. maurorum and A. abyssinica, *Klotzsch l. c.* (*not of Linn.*).

DECCAN PENINSULA, northward to BUNDELKUND, *Wallich*, *Edgeworth*, &c. SCINDE, *Vicary*. CEYLON; north of the island, *Gardner*.—DISTRIB. Arabia, Trop. Africa.

Root slender, perennial. *Stem* or branches 12–18 in., angled and striate. *Leaves* 1½–3 in. long and broad, widely and shallowly cordate at the base; petiole 1–1½ in. *Peduncle* short; bract usually orbicular, variable in position, sometimes basal. *Perianth* 1–1¾ in., base globose, tube cylindric erect slender; lip erect, linear, as long as the tube, dark purple with revolute edges, villous with purple hairs. *Fruit* pyriform, 1 in. long, many-grooved. *Seeds* triangular-cordate.

2. **A. indica,** *Linn.*; *Duchart. in DC. Prodr.* xvi. 479; shrubby, quite glabrous, twining, leaves from linear to obovate-oblong or subpanduriform base cuneate rounded or shallowly cordate 5-nerved, flowers 1–3, bract opposite the base of the peduncles. *Roxb. Fl. Ind.* iii. 489; *Wall. Cat.* 2704; *Klotzsch in Monatsb. Berl. Akad.* 1859, 595; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224. A. lanceolata, *Wight Ic.* t. 1858; *Klotzsch l. c.* A. maysorensis, *Fisch. mss.* A. pandurata, *Wall. mss.* Aristolochia, *Griff. Notul.* iv. 348, and *Ic. Pl. Asiat.* t. 529.—*Rheede Hort. Mal.* viii. t. 25.

Throughout the low country of INDIA from NEPAL, *Hamilton*, and lower BENGAL, *Clarke*, to CHITTAGONG, *J. D. H. & T. T.*; and the DECCAN PENINSULA, from the Concan southward. CEYLON common up to 3000 ft.

Stem woody below, branches slender. *Leaves* membranous, excessively variable, in the narrowest forms 4 by ¼–¾ in., in the broadest 4–5 by 3 in., broadest part at the base or middle or above the middle, abruptly or gradually obtusely acuminate or apiculate, often oblong and quite obtuse; petiole ¼–⅓ in., very slender. *Perianth* straight, greenish, base globose, tube shortly funnel-shaped, mouth oblique trumpet-shaped gradually passing into the short oblong obtuse glabrous brownish lip. *Capsule* 1½–2 in. long, oblong, grooved. *Seeds* flat, triangular, winged.—Wight's *A. lanceolata* occurs both in the Peninsula and Ceylon.

3. **A. Roxburghiana,** *Klotzsch in Monatsb. Berl. Akad.* 1859, 596; quite glabrous, shrubby, twining, leaves large cordate, upper often narrow subsagittately lanceolate lower or all ovate or broadly ovate-oblong pedately 5–7-nerved, upper with the 2 principal nerves produced far beyond the middle, lower with all the nerves spreading, flowers in racemose puberulous cymes, lip of perianth villous. *Duchart. in DC. Prodr.* xv. 1. 480. A. acuminata, *Roxb. Fl. Ind.* iii. 489 (*not of Lamarck*); *Wall. Cat.* 2705; *Wight*

Ic. t. 771; *Miq. Fl. Ind. Bat.* i. 1086; *Grah. Cat. Bomb. Pl.* 178; *Dalz. & Gibs. Bomb. Fl.* 224. A. acuminata, *Duchart. l. c.*

EASTERN HIMALAYA; from Sikkim, alt. 2–5000 ft., *J. D. H.*, to Mishmi, *Griffith.* ASSAM, SILHET, CHITTAGONG, &c., south to PENANG, *Wallich*, &c. DECCAN PENINSULA; on the Ghats from the Concan southward. CEYLON, *Gardner.*—DISTRIB. Java, Borneo.

A stout lofty climber. *Leaves* 4–8 in.; upper 2–3 in. broad, lower 3–5; broadest at the cordate base, sinus deep or shallow, basal lobes sometimes incurved. *Cymes* 1–3 in., lax-fld.; peduncle and pedicels slender; bracts small, oblong. *Perianth* 2–2½ in. long, pale green; base globose, tube curved, mouth oblique with recurved margins; lip linear, straight, obtuse, villous, as long as the tube. *Capsule* very variable, globosely pyriform or oblong, with the long stipes 1–2½ in. long, membranous. *Seeds* most variable, obtusely triangular in the smaller capsules, ⅛–¼ in. broad, with narrow wings and one face studded with tubercles; in larger capsules the seeds are larger and more broadly winged and lip tubercled; in the largest capsules the seeds are ½ in. diam., with very broad wings, and a thin disk quite smooth or sparsely tubercled on one face.—The variations in the leaves of this plant are remarkable, but not so much so as are those of the capsule and seeds. I long thought that these indicated at least two species.

4. **A. atropurpurea**, *Parish mss.*; slender, herbaceous, stem straggling and petiole and cymes pubescent, leaves ovate-lanceolate acuminate base cordate, cymes few-fld. subsessile, lip of perianth glabrous, capsule ½ in.

TENASSERIM; on limestone rocks at Moulmein, *Parish.*

Rootstock woody; stem 1–2 ft., pendulous, zigzag, angular and grooved. *Leaves* purple, 5–7 by 2½–5 in., membranous; 5 basal nerves diverging, slender; petiole 2–3 in. *Cymes* very short. *Perianth* 1–1½ in., very like in form *P. Roxburghii*, base globose, tube funnel-shaped, mouth oblique passing into the straight obtuse glabrous lip with recurved edges. *Capsules* globose, shortly stipitate.

Sect. II. **Siphisia**, *Duchart. Column* 3-lobed. *Anthers* 6.—(Lofty climbers; stem in all woody below; branches twining. *Leaves* large. *Flowers* axillary or chiefly in villous cymes on the old wood. *Perianth* sharply bent back upon itself, lower half on obovoid sac, upper trumpet- or cup-shaped, as long.)

5. **A. platanifolia**, *Duchart. in DC. Prodr.* xv. 1. 437; branches glabrous or pubescent, leaves very broad deeply digitately 3-lobed glabrous or tomentose beneath lobes pinnatifidly lobulate, flowers axillary and solitary also in villous cymes on the old wood, perianth tomentose or villous, mouth obtusely 6-angled lips recurved villous with purple papillose hairs.

EASTERN HIMALAYA; Mishmi Mts., *Griffith*; Sikkim and E. Nepal, alt. 3–6000 ft., *J. D. H.*, &c. KHASIA MTS., alt. 4000 ft., *J. D. H. & T. T.*

A stout lofty climber; old wood with corky rugged fissured bark. *Leaves* a foot long and as broad or broader, cleft to near the base with a rounded sinus, glabrous and shining above, glaucous glabrous pubescent tomentose or woolly beneath, base rounded-cuneate or cordate, lobes very variable, lobules few acute or acuminate; petiole 2–3 in. often stout and twining. *Cymes* shortly peduncled; pedicels 1–1½ in. *Perianth* yellowish with purple veins externally, sac 1½ in. long, tube as long golden yellow within, mouth 1 in. diam. *Capsule* 4–6 by 1–1½ in. diam., linear-oblong with 6 ribs divided by deep furrows.

6. **A. saccata**, *Wall. Pl. As. Rar.* ii. 2, t. 103, and *Cat.* 2707; branches tomentose or glabrate, leaves ovate- or linear-oblong or linear-lanceolate acuminate base deeply cordate glabrous or puberulous above,

beneath pubescent silky or densely tomentose rarely nearly glabrous and glaucous, cymes villous with long hairs, mouth of perianth nearly circular with a narrow reflexed purple papillose border. *Duchart. in Ann. Sc. Nat. Ser.* 4, ii. t. 5, 6, and in *DC. Prodr.* xv. 1. 436; *Bot. Mag.* t. 3640. Siphisia saccata, *Klotzsch in Monatsb. Berl. Akad.* 1859, 603.

EASTERN and CENTRAL HIMALAYA; Nepal, *Wallich*; Sikkim, *J. D. H.*; Bhotan, *Griffith*. ASSAM, *Griffith*. KHASIA MTS., alt. 1–4000 ft., *J. D. H. & T. T.* SILHET, *Bruce*.

Habit and stature of *A. platanifolia*, of which Duchartre suggests it may be a form, but no intermediates have occurred. *Leaves* very variable in size and pubescence, largest 12 by 6 in., longest 16 by 4 in., narrowest (var. *angustifolia*, Duchart. l. c.) 12 by 2½ in., cordate base deep or shallow, petiole 1–2 in. *Cymes* and perianth much more villous than *A. platanifolia*.

Var.? *dilatata*, lips of perianth greatly dilated ½–¾ in. diam.—Kumaon, *Blinkworth* (*Wall. Cat.* 2707 B); alt. 7–8000 ft., *Strachey & Winterbottom*.

7. **A. Cathcartii**, *Hook. f.*; branches petioles and leaves beneath densely silkily villous, leaves rounded-cordate acute or ovate-lanceolate acuminate, cymes and perianth densely villous with very long spreading hairs, perianth bearded with long hairs, mouth very wide square with very broad recurved lips fringed with long purple papillose hairs. A. saccata, *var.* villosa, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA and KHASIA MTS.?, alt. 2–3000 ft., *J. D. H. & T. T.*

Habit of *A. saccata*, but leaves shorter broader with dense silky shaggy wool beneath, and a very different perianth, the tube of which is far more dilated, with a much broader square mouth. *Capsule* as in *A. saccata*.—A fine drawing of this, made by Mr. Cathcart's artists, represents so different a plant from *A. saccata*, that it can hardly be a variety.

8. **A. Griffithii**, *Hook. f. & T. in Herb. Ind. Or.*; *Duchart. in DC. Prodr.* xv. 1. 437; branches glabrous with villous tips, leaves broadly ovate- or orbicular-cordate acute densely tomentose beneath, flowers axillary, perianth densely pubescent, tube above the sac abruptly dilated into a hemispheric cup 3–4 in. diam. with erect margins. Aristolochia, *Griff. Notul.* iv. 190, No. 1015.

EASTERN HIMALAYA; Bhotan, alt. 8000 ft., *Griffith*; Sikkim, alt. 7–9000 ft., *J. D. H.*

A tall climber. *Leaves* 4–6 in. long and often as broad, woolly but not shaggy beneath; petiole 2–4 in. *Flowers* apparently all solitary and axillary (extra-axillary, *Griffith*); peduncle villous, 2–3 in., with one or two leafy bracts. *Perianth* uniformly closely pubescent; sac ribbed and veined; limb or cup "ochreous yellow with radiating lines of clavate red warts, throat blood-red; tube yellow and spotted red within," *Griffith*. *Capsules* 7 inches long, shortly stipitate, twisted at the base, with 6 strong ribs and as many deep furrows. *Seeds* orbicular, convex on one face, concave with a median ridge on the other.—A remarkable species. The extracts translated from Griffith's Notulæ must be accepted cautiously, the Latin not being very intelligible.

DOUBTFUL AND EXCLUDED SPECIES.

ARISTOLOCHIA SPECIES.—Western Himalaya; Chamba, alt. 5000 ft., *Clarke*.—A slender climber, branches puberulous, leaves shortly petioled, 4–5 by 1–1¼ in., membranous lanceolate finely acuminate from a truncate or broadly cordate base, basal nerves short.—This flowerless plant referred to Aristolochia doubtfully by Mr. Clarke, and I should think correctly, is far beyond the geographic range of any other Indian species.

A. THWAITESII, *Hook. Bot. Mag.* t. 4918, *and under* 5295, was erroneously supposed to be a Ceylon species. Its native country is unknown.

ORDER CXXIV. PIPERACEÆ.

Herbs or shrubs, rarely subarboreous, aromatic. *Leaves* alternate opposite or whorled, often pellucid-dotted, entire; stipules 0 or 2 connate, or adnate to the petiole. *Flowers* minute, 1–2-sexual, in axillary or terminal catkin-like spikes subtended by a peltate bract. *Perianth* 0. *Stamens* 2–6, rarely 7–8, hypogynous; anthers often jointed on the filaments, bursting longitudinally, or with the cells confluent. *Ovary* 1-celled, or of 3 or more carpels free or connate below; stigmas sessile, simple or penicillate. *Ovules* 1 or more, orthotropous. *Fruit* small, of the 1-celled genera indehiscent, of the pluri-carpellar forming cocci or follicles. *Seeds* globose ovoid or oblong; testa thin, albumen copious floury; embryo minute, enclosed in a sac; radicle superior.—Genera 8, species enumerated about 1000 (probably exaggerated), chiefly Tropical American.

Tribe I. **Saurureæ.** *Ovary* of 3–4 free or connate carpels.

Stamens 3–6. Ovary 1-celled . . . . 1. HOUTTUYNIA.

Tribe II. **Pipereæ.** *Ovary* 1-celled.

Anther-cells distinct. Fruit not minute, stigmas 3–5 confluent . 2. PIPER.
Anther-cells confluent. Fruit minute, stigma usually penicillate 3. PEPEROMIA.

1. HOUTTUYNIA, *Thunb.*

Perennial herbs? *Leaves* alternate, usually cordate; stipules broad, membranous. *Spikes* terminal and leaf-opposed, peduncled, involucrate; involucre of 4–6 white petaloid bracts. *Flowers* minute. *Perianth* 0. *Stamens* 3–6; filaments below adnate to the ovary; anthers oblong. *Ovary* of 3–4 partially connate 1-celled carpels; styles free, erect, stigmatose on the inner surface; ovules many on parietal placentas. *Fruit* subglobose, bursting between the styles. *Seeds* globose, testa membranous.—Species 2 or 3; Eastern Asiatic and Californian.

H. cordata, *Thunb. Fl. Jap.* 234, t. 26; leaves cauline cordate, bracteoles minute. *Cas. DC. in Prodr.* xvi. 1. 238; *Poir. Encycl.* ii. t. 739; *Bot. Mag.* t. 2731; *Schnizl. Icon.* t. 82; *Roxb. Fl. Ind. Ed. Wall. & Carey,* i. 360. Polypara cochinchinensis, *Lour. Fl. Coch.* i. 78.

TROPICAL HIMALAYA; from Garwhal to Sikkim, alt. 1–5000 ft. ASSAM and KHASIA MTS., *Griffith, &c.* DISTRIB.—Siam, China, Japan.

Rootstock creeping; stem 1–3 ft., herbaceous, erect, leafy, subsimple, angular, pubescent at the nodes. *Leaves* 1½–2½ in. long and broad, very broadly ovate-cordate, acuminate, 5-nerved, abruptly narrowed into the petiole, glabrous or nerves pubescent beneath, gland-dotted; petiole 1–2 in., base sheathing; stipules long, linear-oblong, obtuse. *Bracts* ½–½ in., rounded or oblong. *Spike* ½ in., elongating in fruit to 1–2 in., dense-fld. *Stamens* 3.

2. PIPER, *Linn.*

Shrubs, rarely herbs or trees, with swollen nodes, often glandular and aromatic. *Leaves* entire, often unequal-sided; stipules various. *Flowers* very minute, diœcious, very rarely 2-sexual, spiked, each in the axil of a bract with or without lateral bracteoles; bracts peltate, or cupular and adnate to the rachis, sometimes decurrent on the rachis with or without raised margins; bracteoles if present forming low ridges on each side of the flower, or connate in a semilunar form. *Perianth* 0. *Stamens* 1–4, rarely more, filaments short; anthers 2-celled, cells often confluent by dehiscence. *Ovary* 1-celled; style conic beaked or 0, stigmas 2-5; ovule solitary, erect. *Berry* ovoid or globose. *Seed* usually globose, testa thin, albumen hard.—Species described about 500 (probably greatly exaggerated), all tropical or subtropical.

A most difficult genus, Herbarium materials for the analysis of which have never [illegible] Vahl's "Enumeratio" and in Roxburgh's [illegible] the works of the only two authors who have attempted the revision of the Indian species, namely Miquel and Casimir De Candolle. Of these Wallich's specimens are so mixed that in some cases three or four species are included under one name and number, and even on one sheet; whilst of Vahl's diagnoses not one is sufficient to identify the plant he means, and of Roxburgh's only one or two species are recognizable. Wallich, it is true, often attaches to his specimens names given by Roxburgh, but these are rarely the names that are taken up in the "Flora Indica;" or if they are, they do not apply to the plants described in that work. The only considerable collections of Indian *Piperaceæ* made since Wallich's were distributed, are Wight's Peninsular, Griffith's Transgangetic Indian, and Thomson's and my own from Sikkim, Bengal, the Khasia Mts., &c. Wight published good figures of several, but confined himself to such as were named by Miquel and to the reproduction of a few of Roxburgh's unpublished Icones, procured from the Calcutta Botanic Gardens. Griffith's specimens were hurriedly collected, with no attempt to match the sexes, or the flowering with the fruiting specimens, for doing which his rapid journeys precluded the possibility. Unfortunately the Ceylon peppers were not thoroughly studied by either Gardner or Thwaites, the only two botanists who had opportunities for so doing previous to Dr. Trimen's incumbency of the Botanical Gardens, and who will doubtless elucidate them. In the process of attempting (with little success, I fear) to discriminate the Indian species for this work, and to unravel their intricate synonymy, I have been much impressed by the correctness of Miquel's views as to the ordination of the species, and the skill with which he has grouped them. When he undertook to monograph the Order, the materials were very bad, were in a chaotic state of confusion, and were so scattered in the British and Continental herbaria, that he could bring no two large collections under his eye at one time. Yet he traced the outlines of a good system, gave characters to a large proportion of well-defined species, and founded genera, which though now reduced to sections of one genus are for the most part natural groups. In the discrimination and elucidation of species he was too hasty by far. For the rest I must leave the further study of the Order to local botanists in the four great centres of its Indian distribution, namely its transgangetic provinces, the South Deccan, the Malayan Peninsula, and Ceylon; in each of which the species should be examined on the spot, with a view to matching the sexes, and flowering with fruiting specimens, and to observing the transition from young to old foliage, and the effects of locality and climate on the characters of each species.

Sect. I. **Muldera.** *Spikes* solitary. *Flowers* diœcious, the males sunk in a fleshy stipitate or sessile receptacle formed of the greatly enlarged bract (and bracteoles?). *Berries* sessile; stigmas sessile.—The female plants of this section are imperfectly known, and may possibly be confounded with others.

* *Receptacle of male fl. stipitate.*

1. **P. Schizonephros,** *Cas. DC. in Prodr.* xvi. 241; quite glabrous, leaves coriaceous elliptic-lanceolate acuminate 3-nerved at the very base, male spikes hoary, receptacles distant stipitate not recurved about 8-androus. Schizonephros glaucescens, *Griff. Notul.* iv. 386.

MALACCA; at Ching, *Griffith.*

Branches very slender, terete, stiff; nodes much thickened. *Leaves* 3-5 by 1-2 in., base unequal; petiole stout, ¼-½ in. *Spikes* 6-7 in., very slender; receptacles reniform, about ⅒ in. diam., tomentose within.—Cas. DC. unites with this a Javan plant in fruit which is named by Junghuhn *P. Cubeba*, possibly rightly; but the leaves are more narrowed at the tip and the spike is not hoary. I have altered the misprint "Schizonephos" to "-nephros," as in Griffith's mss., the derivation from *νεφρὸς* a kidney being obvious.

2. **P. Maingayi**, *Hook. f.*; leaves thickly coriaceous elliptic-ovate or lanceolate acuminate 5-7-nerved quite glabrous, male spikes finely tomentose, receptacles stipitate not recurved 3-5-androus.

SINGAPORE and MALACCA, *Maingay.*

Branches stout. *Leaves* 4-5 by 2-2½ in., nerves prominent on both surfaces, nervules obsolete; petiole ¼-⅓ in. *Spikes* 1-2 in.; peduncle short. *Receptacles* of male peltate, ⅒ in. diam.; of female minute, cupular. *Berry* about ¼ in. diam.—The leaf is like *P. firmum*, but the pubescent spikes very different.

3. **P. galeatum**, *Cas. DC. in Prodr.* xvi. 242; quite glabrous, leaves thinly coriaceous elliptic-ovate or lanceolate finely acuminate 3-nerved from the very base, male spikes slender, receptacles distant stipitate recurved diandrous. Muldera galeata (in part), *Miquel in Hook. Lond. Journ. Bot.* v. 557. M. Wightiana, *Wight Ic.* t. 1943, *right-hand figure only*; *Miquel l. c.*

TRAVANCORE; at Courtallam, *Wight.*

Branches slender, nodes thickened. *Leaves* 3-5 by 1¾-2 in., nervules distinct beneath; petiole ¼-½ in. *Male spike* 6-10 in., quite glabrous; receptacles obliquely kidney-shaped, recurved, longer than the stipes, mouth very small.—Miquel describes female flowers, but I find none in Wight's Herbarium. Some authentically-named specimens in Arnott's Herbarium ticketed *M. Wightiana* are identical with *galeata.*

** *Receptacle of male spikes sessile or unknown.*

4. **P. trichostachyon**, *Cas. DC. in Prodr.* xvi. 1. 242; glabrous, leaves elliptic-lanceolate acuminate moderately coriaceous with 3 basal nerves and 2 subopposite from the midrib above them, spike stout hoary, male receptacles sessile globose diandrous. Muldera trichostachya, *Miquel in Hook. Lond. Journ. Bot.* v. 556; *Wight Ic.* t. 1944.

DECCAN PENINSULA; The Concan and Canara, *Stocks*, &c.; Kandella, *Dalzell*; NILGHERRY and SHEVAGHERRY HILLS, *Wight.*

Stem stout, woody; branches stout or slender. *Leaves* 5-6 by 1-2 in., 2nd pair of nerves often stronger than the first, nervules slender. *Spikes* stout, 3-4 in. *Receptacles* tomentose at the mouth. *Fruit* globose, ¼ in. diam.

5. **P. pachyphyllum**, *Hook. f.*; glabrous, leaves shortly petioled very thickly coriaceous oblong or orbicular-obovate or elliptic acute or acuminate, nerves broad faint 2-3 pairs basal and one higher up, all lost above in the thick texture of the leaf, fruiting spike very stout, sunk in the fleshy rachis.

MALACCA, *Griffith.*

Leaves 4-6 by 2-4 in., probably fleshy, pale yellowish when dry, nerves obscure; petiole ¼-½ in., very stout. *Fruiting spike* 2½ in.; peduncle much longer than the petiole, very stout; rachis glabrous, bract and bracteoles forming a ring round the base of the smooth globose fruit.—I place this in *Muldera* from its resemblance to *P. Maingayi* in foliage, but which has a very different fruiting-spike. I have seen no male or female flowers.

Sect. II. **Cubeba.** *Spikes* solitary; flowers diœcious; bracts of female spikes peltate. *Fruit* contracted at the base into a pedicel.

* *Quite glabrous* (*see also* P. caninum var. *glabra*).

6. **P. ribesioides,** *Wall. Pl. As. Rar.* i. 79, t. 9, and *Cat.* 6637; quite glabrous, very robust, leaves 8–12 in. very coriaceous linear- or ovate-oblong acuminate base deeply cordate 5–9-nerved at the very base 3-nerved higher up, petiole 1–2 in., fruiting spike short stout, pedicel glabrous as long as the globose apiculate fruit. *Cas. DC. in Prodr.* 342. Cubeba Wallichii, *Miq. Syst. Pip.* 289, and *Ill. Pip.* 47, t. 46, 47.

TENASSERIM, *Helfer, Falconer.* PENANG and SINGAPORE, *Wallich, Maingay.* BURMA; at Chappedong, *Wallich.*

A very stout climber; branches pale, as thick as a goose-quill, deeply furrowed when dry. *Leaves* variable, sometimes 5 in. broad, basal sinus 1–1½ in. deep, lobes rounded equal or not; nerves very strong beneath, nervules slender; petiole very stout; young leaves small, lanceolate, subsagittately cordate. *Spikes* 1–3 in.; bracts short coriaceous, rachis of spike stout rigid; bracteoles together semilunar. *Fruit* ⅓ in. diam.

7. **P. sumatranum,** *Cas. DC. in Prodr.* xvi. 1. 343; quite glabrous, very robust, leaves 8–12 in. very coriaceous oblong or linear-oblong acuminate 5–7-nerved at the very shortly cordate base and 3-nerved higher up, petiole 1–1½ in., fruiting spike 2–3 in. very stout, pedicel glabrous as long as the globose apiculate fruit is broad. Cubeba sumatrana, *Miq. Comm. Phyt.* 42, t. 5 a; *Syst. Pip.* 290, and in *Fl. Ind. Bat.* i. 2. 448, and *Suppl.* 186. P. pedicellosum, *Wall. Cat.* 6646 B P.

TENASSERIM and ANDAMAN ISLANDS, *Helfer.* PENANG, *Wallich.* SINGAPORE, *Maingay.*—DISTRIB. Sumatra.

Very closely allied to *P. ribesioides*, and perhaps only a state of that plant, which the fruit entirely resembles, but the leaves are narrower, more contracted at the base, with a very small short sinus. The male flowers are unknown in both. Possibly they are both large forms of *P. Cubeba*, L. fil.

8. **P. pedicellosum,** *Wall. Cat.* 6646 A; quite glabrous, robust, leaves 2–4 in. very coriaceous elliptic or ovate-cordate obtuse 5–7-nerved near the base, petiole ¼–½ in., fruiting spikes 1–1½ in. very stout, pedicel hoary as long as the subovoid obtuse fruit. *Cas. DC. in Prodr.* xvi. 1. 343. Cubeba Neesii, *Miq. Syst. Pip.* 292, and *Fl. Ind. Bat.* i. 2. 449.

SINGAPORE, *Wallich.*

This resembles *P. Cubeba*, Linn. f., but has hoary pedicels of the fruit. The smaller leaves, short petiole, and fruit, distinguish it from *P. ribesioides* & *sumatranum.*

9. **P. Griffithii,** *Cas. DC. in Seem. Journ. Bot.* 1866, 163, and in *Prodr.* xvi. 1. 343; quite glabrous, branches slender, leaves thinly coriaceous ovate or elliptic 3–5-nerved at the base and 3-nerved higher up, fruiting spikes 6–8 in., pedicels slender longer than the very small globose fruit.

ASSAM, *Masters, Griffith.*

Branches terete or obscurely furrowed when dry. *Leaves* 4–6 by 2–3½ in., base rounded or subacute; nerves very slender, nervules faint; petiole ¼–½ in. *Female spikes* slender; bracts obscure in fruit, cup-shaped, adnate to the glabrous rachis, bracteoles short. *Fruits* numerous, globose, ⅛ in. diam.

** *Leaves more or less pubescent beneath* (*glabrous in vars. of* P. caninum).

10. **P. caninum,** *Blume in Verh. Batav. Genoots.* xi. 214, f. 26, and *Enum. Pl. Jav. fasc.* 1. 72; hirsute pubescent or glabrate, branches slender terete, leaves petioled membranous ovate ovate-cordate or lanceolate acuminate rarely elliptic-lanceolate 3–5-nerved towards the base, male spikes slender, fruiting slender, fruit very small, pedicel sometimes very short. *Cas. DC. in Prodr.* xvi. 1. 341. P. Cubeba, *Vahl Enum.* i. 332; *Roxb. Fl. Ind.* i. 159; *Ed. Carey & Wall.* i. 161; *Wall. Cat.* 6645; *Nees Plant. Med.* t. 22. Cubeba canina, *Miq. Comm. Phyt.* 33, t. 3; *Syst. Pip.* 293, and *Fl. Ind. Bat.* i. 2. 449, and in *Ann. Mus. Lugd. Bat. fasc.* v. 137.

TENASSERIM (or Andaman Islands?), *Helfer*. MALACCA, *Griffith*, *Maingay*. PENANG, *Wallich*.—DISTRIB. Malay Islands.

A rambling climber, more or less hirsute with flaccid hairs, rarely quite glabrous. *Leaves* 2–4 by 1½–2 in., usually broadest at the base which is rarely unequal-sided, nerves slender; petiole ¼–1 in., slender. *Male spikes* 2–3 in.; bracts adnate by a broad base, stamens 2, anther-cells distinct. *Fruiting spike* ½–1½ in.; peduncle slender; bracts peltate, villous. *Fruit* ⅛ in. diam., pedicel variable in length, always shorter than the fruit.

P. caninum proper; branches glabrate, except the younger, leaves glabrous above, finely pubescent beneath.

Var. *glabra*; leaves quite glabrous.—Tenasserim (or Andaman Islands), *Helfer*.

Var. *lanceolata*; leaves elliptic-lanceolate finely acuminate very sparsely hairy beneath, pedicel of fruit very short. P. Lonchites, *Wall. Cat.* 6644 B, *in part* (*the centre plant of the four on the sheet*). Penang, *Wallich*.—Wallich tickets this P. lanceolatum, *Roxb.*, but Roxburgh's plant of that name is, I think, clearly *P. miniatum*.

Var. *angustifolia*, Miq. mss.; leaves smaller linear-lanceolate 2–2½ by ⅛–⅜ in. nearly glabrous.—Malacca, *Maingay* (*Kew Distrib.* 1333/4).—This appears the same as Zollinger's No. 698 f. from Java, named *Cubeba canina*. var. *angustifolia*, Miq. Mant. Pip.

Var. *lanata*; branches and leaves beneath hirsute. P. lanatum, *Roxb. Fl. Ind.* i. 159; *Ed. Carey & Wall.* i. 161; *Wall. Cat.* 6647; *Cas. DC. in Prodr.* xvi. 1. 341. P. Lonchites, *Wall. Cat.* 6644 A, *in part*. P. Cubeba, *Wall. Cat.* 6645 (*not of Linn. f.*). P. javanicum, *Cas. DC. l. c.* 343. Cubeba lanata, *Miq. Syst. Pip.* 298, and *Fl. Ind. Bat.* i. 2. 450. C. Lowong *var.* quintuplinervis, *Miq. l. c.* 298.—Penang, *Wallich*.

Var. ? *Thwaitesii*; branches glabrous, leaves ovate-lanceolate glabrous or sparsely pubescent beneath, fruiting spikes nearly glabrous, fruit very shortly pedicelled. P. arcuatum, *Thwaites Enum.* 293, *in part* (*not of Blume*). P. arborescens, *Thwaites l. c.* (*not of Roxb.*). P. Thwaitesii, *Cas. DC. l. c.* 357. P. bantamense, *Cas. DC. l. c.* 362 (*the Ceylon plant only*).—Ceylon, *Thwaites* (*C. P.* 35 *in part*, and 2178).

11. **P. muricatum,** *Blume in Verh. Batav. Nat. Genoots.* xi. 219, f. 1, and *Enum. Pl. Jav. fasc.* i. 68; branches stout hirsute or glabrate, leaves large membranous elliptic or elliptic-oblong acuminate 7–9-nerved sparsely hairy above tomentose beneath, female spike 5–6 in. stoutly pedicelled tomentose, rachis stout, bracts peltate, fruit sessile and pedicelled. *Miquel Syst. Pip.* 326; *Ill. Pip.* 55, t. 55, *in Hook. Lond. Journ. Bot.* iv. 438, and *Fl. Ind. Bat.* i. 2. 2454; *Cas. DC. in Prodr.* xv. 1. 341. P. birmanicum β. macrostachyum, *Cas. DC. l. c.* 338.

MALACCA, *Griffith*.—DISTRIB. Sumatra, Java, Borneo.

Stem evidently stout and soft; branches as thick as a goose-quill, roughly hairy. *Leaves* 6–9 by 3½–6 in., base rounded or subcordate rarely subacute, equal or unequal; petiole ¼–3 in. *Spike* 1–2-sexual, erect or drooping; peduncle ¼ in.; bracts glabrous above, subsessile, orbicular. *Fruit* unripe on thick pedicels, many imperfect, the pedicel being truncate. "*Seed*, subglobose," *Miquel*.—The leaves are most variable in form and pubescence.

Var. *glabrata*; branches glabrous below, above hispid, as are the petioles peduncles and leaf-nerves beneath.—Mishmi Hills in Upper Assam, *Griffith*.

Sect. III. **Chavica.** *Spikes* solitary; flowers diœcious. *Bracts* orbicular, peltate. *Fruit* very small, in dense cylindric rarely globose spikes, sessile.

* Fruiting spikes much longer than broad. Stigma sessile.

† *Leaves quite glabrous* (*see also* 23. Hapnium) *sometimes slightly pubescent in* P. sylvaticum.

12. **P. longum,** *Linn. Sp. Pl.* 29; glabrous, branches soft angular and grooved when dry, lower leaves long-petioled ovate-cordate upper narrower oblong-cordate sessile amplexicaul; fruiting spikes short suberect. *Cas. DC. in Prodr.* xvi. 1. 355; *Vahl Enum.* i. 334; *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 156; *Grah. Cat. Bomb. Pl.* 199; *Dalz. & Gibs. Bomb. Fl. Suppl.* 84; *Wall. Cat.* 6640; *Nees Med. Bot.* t. 23; *Woodv. Med. Bot.* iv. t. 247; *Bentl. & Trim. Med. Pl.* iii. t. 244. P. sarmentosum, *Wall. Cat.* 6641. P. latifolium, *Hunter in As. Research.* ix. 390. Chavica Roxburghii, *Miq. Syst. Pip.* 239, *Ill. Pip.* 35, t. 30, and *Fl. Ind. Bat.* i. 2. 440; *Hayne Arnz. Gewachs.* xiv. t. 20; *Wight Ic.* t. 1928. C. sarmentosa, *Miq. in Hook. Lond. Journ. Bot.* iv. 433, v. 531 (*not of Syst. Pip.*?).—*Rheede Hort. Mal.* vii. 27, t. 14.

Hotter provinces of India, from EAST NEPAL to ASSAM, the KHASIA MTS. and BENGAL, westward to BOMBAY, and southward to TRAVANCORE, CEYLON and MALACCA, wild or cultivated.—DISTRIB. Malay Islands.

Stems creeping below; "young shoots downy, branches prostrate or creeping with broad leaves, flowering shoots erect," *Roxb.* *Lower leaves* 2–3 in., often rounded-ovate, acuminate, 7-nerved, sinus rounded but narrow, basal lobes equal; petiole 1–3 in.; upper leaves much narrower, with often unequal basal lobes. *Male spikes* 1–3 in.; female $\frac{1}{2}$–$\frac{2}{3}$ in. *Fruit* about $\frac{1}{10}$ in. diam.—The Malabar plant referred to *P. sarmentosum* by Miquel (Lond. Journ. Bot. l. c.), and a Malacca one so named by him, seem to me undistinguishable from *P. longum*, and I doubt *sarmentosum* being a distinct species. Of the Mergui *P. sarmentosum* (Fl. Ind. Bat.) I have seen no specimens. Wallich's *P. sarmentosum* (No. 6641) has broader upper leaves, and is perhaps the true plant. He is the authority for referring Hunter's *P. latifolium* to it.

13. **P. peepuloides,** *Roxb. Fl. Ind.* i. 159, and *Ed. Carey & Wall.* i. 158; glabrous, branches slender rigid terete often warted, leaves membranous shortly petioled very uniform oblong linear- or ovate-oblong caudate-acuminate, base rounded 3–5-nerved nearly to the tip, fruit minute. *Wall. Cat.* 6650 A. P. brachystachyum, *Wall. Cat.*, 6656, *in part.* Chavica peepuloides, *Miq. Syst. Pip.* 237; *Cas. DC. in Prodr.* xvi. 1. 389. C. Neesiana, *Miq. l. c.* 249.

TROPICAL HIMALAYA; from Nepal, *Wallich*, to Bhotan, *Griffith*. ASSAM, SILHET and the KHASIA MTS., common, ascending to 3000 ft. CHITTAGONG, *J. D. H. & T. T.*

A slender bush, climbing below with free spreading slender branches. *Leaves* 2–5 by 1–2 in., variable in breadth, sometimes narrowed to a minutely cordate base; petiole of upper leaves $\frac{1}{8}$–$\frac{1}{4}$ in., of lower rarely $\frac{1}{3}$ in. *Male spikes* slender, 2–3 in., clothed with peltate bracts; stamens 2–4; female $\frac{1}{3}$–$\frac{2}{3}$ in., cylindric, longer than their peduncle. *Fruit* $\frac{1}{12}$ in. diam.—The branches are frequently warted as in *P. brachystachyum*, to which this is most closely allied.

14. **P. Chaba,** *Hunter in As. Research.* ix. 391 (*not of Blume*); quite glabrous, stem stout climbing and rooting, leaves very short-petioled rather

coriaceous oblong-ovate or -lanceolate acuminate 3–5-nerved at the very obliquely cordate auricled base penninerved above it, fruiting spike stoutly peduncled suberect conico-cylindric. *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 158 P. maritimum, *Blume Herb. Lugd. Bat.* P. longum, *Blume Verh. Bat. Genoots.* ix. 197, and *Enum. Pl. Jav.* i. 70 (*excl. various syn.*). P. callosum, *Opiz in Reliq. Hænk.* iii. 152. P. officinarum, *Cas. DC. in Prodr.* xvi. 356. P. Arnottianum, *Cas. DC. l. c. excl. syn.* P. glabrum, *Roxb. Ic. pict. ined.* P. peepuloides, *Wall. Cat.* 6650 E, F. Chavica officinarum, *Miq. Syst. Pip.* 256, *Ill. Pip.* 39, t. 34, and *Fl. Ind. Bat.* i. 2. 444; *Hayne Arnz. Gewachs.* xiv. t. 21. C. maritima, *Miq. Syst.* 262. C. peepuloides, *Wight Ic.* t. 1927 (*not of Roxb.*).—*Rumph. Herb. Amb.* v. 333, t. 116, f. 1.

Cultivated in various parts of INDIA and the Malay Islands.

Branches flexuous, terete, hard, finely striate when dry, pale. *Leaves* 5–7 by 2½–3½ in., rather shining above, pale when dry, base very variable, nerves 3–6 pair above the 3–5 basal; nervules arching; petiole ¼–⅓ in. *Fruiting spikes* 1–2 in. long, ½ in. diam., broadest at the base, obtuse, forming a fleshy cone of innumerable fruits ⅛ in. diam.—The alternate nerves of the main portion of the leaf, all starting from the midrib, are very characteristic of this species. I have seen no certain male fl. Rumph's figure, quoted by Hunter, is very characteristic of the venation above the base, but it omits the basal nerves.

15. **P. sylvaticum,** *Roxb. Fl. Ind.* i. 156, and *Ed. Carey & Wall.* i. 158; glabrous, stem flaccid creeping angular and furrowed when dry, leaves membranous long-petioled broadly ovate or ovate-cordate acuminate 5–7-nerved from the base or the inner pair higher inserted, upper leaves elliptic or oblong-lanceolate shorter petioled, male spikes 2–3 in. slender, fruiting female short erect ¾–1½ in., fruit free. *Cas. DC. in Prodr.* xvi. 1. 355; *Wall. Cat.* 6653 A, B. ? P. Betle, *Wall. Cat.* 6652 C. P. Malamiri, *Roxb. ex Wall. Cat.* 6642 A (*not of Roxb.*). Chavica sylvatica, *Miq. Syst. Pip.* 248; *Wight Ic.* t. 1930.—Chavica, No. 19, *Herb. Ind. Or. Hook. f. & T.*

Upper and lower ASSAM, *Masters, Griffith,* &c. Jheels of BENGAL, *J. D. H. & T. T.* (? NEPAL) and AVA, *Wallich.* TENASSERIM; at Mergui, *Griffith.*

A low creeping species; stems succulent, several feet long, contracting much in drying; branches short, erect, or ascending, flexuous. *Leaves* rarely puberulous on the nerves beneath, lower 3 by 2½–3 in., nerves slender; upper as long but narrower; petiole of lower 2–4 in. *Spikes* shortly peduncled; males as in *P. peepuloides*, but bracts larger; stamens generally 4 (*Roxburgh*, I find 2); anthers reniform, cells confluent, dehiscing over the crown, female always erect. *Fruit* ⅙–⅛ in. diam.—A very distinct species, something like *P. attenuatum* with more the habit of *P. longum*; it is probably not uncommon in marshy districts. It may be Roxburgh's *P. Malamiris*, as Wallich's ticket says; but the original of *P. Malamiris* of Linnæus (Sp. Pl. Ed. i. p. 29) consists of a mixture of plants, for which he cites the Flora Zeylanica, Plukenet, and the Amalago of Rheede, giving as the native country both the East and West Indies.

16. **P. petiolatum,** *Hook. f.*; quite glabrous, branches stout, leaves large long-petioled thinly coriaceous rounded-ovate acuminate 7-nerved nervules arching, fruiting peduncle very short spike short cylindric. Chavica petiolata, *Cas. DC. in Prodr.* xvi. 1. 389 (*excl. the Khasian plant*).

UPPER ASSAM; Mishmi Hills, *Griffith.*

There are only 2 specimens, both in fruit; each consists of a stout branch 6 in. long and with 4 leaves, each 6 by 3½–5 in. with rounded bases, opaque above with the nerves obscure, the latter strong beneath, connected by the arching venules; fruiting spike 1–1½ in.; fruit globose, ¼ in. diam., yellow.

17. **P. Betle,** *Linn. Sp. Pl.* 28; quite glabrous, or with the petioles puberulous, stem and branches stout climbing compressed when dry, leaves large coriaceous petioled obliquely ovate-oblong or rounded ovate-cordate 5–7-nerved, base often unequal, petiole ½–1½ in., male spikes 3–6 in., female long-peduncled, fruiting stout 1–5 in. pendulous. *Hunter in As. Res.* ix. 390; *Vahl Enum.* i. 328; *Roxb. Fl. Ind.* i. 158, and *Ed. Carey & Wall.* i. 166; *Dalz. & Gibs. Bomb. Fl. Suppl.* 89; *Wall. Cat.* 6652 A; *Bot. Mag.* t. 3132; *Cas. DC. in Prodr.* xvi. 1. 359; *Burm. Fl. Ind.* 14, and *Fl. Zeyl.* t. 82, f. 2. P. Siriboa, *Linn. Sp. Pl.* 29; *Hunter l. c.* 391; *Vahl l. c.* 332. P. Betle *var.* Siriboa, *Cas. DC. l. c.* P. peepuloides, *Wall. Cat.* 6650 C. P. Chavya, *Ham.*; *Cas. DC. l. c.* Chavica Betle, *Miq. Syst. Pip.* 224, and *Fl. Ind. Bat.* i. 2. 439; *Wight Ic.* t. 2926. C. Siriboa, *Miq. l. c.* 228, *in Hook. Lond. Journ. Bot.* iv. 433, and in *Fl. Ind. Bat.* i. 1. 438; *Thwaites Enum.* 292. C. Chuvya, *Miq. Syst. Pip.* 267, and *Ill. Pip.* 42, t. 39.—*Rheede Hort. Mal.* vii. 29, t. 15.

Cultivated in the hotter and damper parts of INDIA and CEYLON, and in the Malay Islands.

Apparently a larger and stouter plant than the other species of this section, with more coriaceous usually broadly ovate leaves, sometimes 4–5 in. diam.; spikes longer and longer-peduncled; fruit ⅙–¼ in diam., very fleshy and often confluent into a cylindric fleshy red mass. *P. Chuvya* and *Siriboa* are, I suppose, large-leaved cultivated forms; the latter is described as having pubescent young leaves, which I do not observe, though the petioles are sometimes, but not always, puberulous.

18. **P. miniatum,** *Blume in Verh. Bat. Genoots.* xi. 166, and *Enum. Pl. Jav. fasc.* i. 65; quite glabrous, branches rigid terete, nodes much swollen, leaves very shortly petioled large coriaceous elliptic-oblong or lanceolate caudate-acuminate 5-nerved from the very base, spikes very long erect most dense-fld., fruit very minute. *Cas. DC. in Prodr.* xvi. 1. 351. P. auriculatum, *Blume ll. c.* 171 and 66. P. glandulosum, *Opiz in Presl Rel. Hænk.* 158. P. arborescens, *Wall. Cat.* 6648 A. P. lanceolatum, *Roxb. Fl. Ind.* i. 159. P. Lonchites, *Wall. Cat.* 6644 A, *the two upper specimens only.* P. moluccanum, *Spreng. Syst. Veg.* i. 112. Chavica miniata, macrostachya & ? lanceolata, *Miq. Syst. Pip.* 234 and 236, *Ill. Pip.* 32, 33, t. 28, 29, and *Fl. Ind. Bat.* i. 2. 440. ? C. lanceolata, *Miq. Syst. Pip.* 264, and *Fl. Ind. Bat.* i. 1. 445. Cubeba macrostachya, *Miq. Comm. Phyt.* 38.

MALACCA, *Griffith* (*Kew Distrib.* 1327). SINGAPORE, *Lobb.* PENANG, *Wallich.*—DISTRIB. Java, Banda, Philippines.

Branches as thick as a crow-quill, very hard and smooth. *Leaves* 3–7 by 1½–3½ in., rigid, shining above, base nearly equal, nerves stout, nervules transverse; petiole ⅙–¼ in. *Spikes* most dense-fld. of any Indian species; fruiting ⅙–¼ in. diam., tapering from the base; bracts minute, peltate, hairy; stamens 3. *Fruit* 1/20 in., ellipsoid, stigmas 3.—Miquel describes a Sumatran variety with hairy shoots and nerves beneath. His *C. lanceolata* is a very doubtful plant.

19. **P. bœhmeriæfolium,** *Wall. Cat.* 6654 A; tall, quite glabrous, branches subterete when dry, often warted, leaves membranous very shortly petioled or the upper sessile obliquely oblong or linear-oblong acuminate often narrowed at the very unequal almost auricled base 5–7-nerved, nerves distant, male and female spikes 3–6 in., peduncles slender much longer than the petioles. *Cas. DC. in Prodr.* xvi. 1. 348. Chavica bœhmeriæfolia, *Miq. Syst. Pip.* 265, and *Ill. Pip.* 41, t. 37.

TROPICAL EASTERN HIMALAYA; Sikkim, ascending to 5000 ft., *J. D. H.* Bhotan, *Griffith.* ASSAM, SILHET and the KHASIA MTS., *Wallich,* &c. PEGU, *Kurz.* TENASSERIM, *Parish.*—DISTRIB. Ava.

Branches not stout, rather soft. *Leaves* very variable, in the typical form

(Wallich's) 6–7 by 1½–2½ in., broadest above the middle with narrow unequal bases; in some Khasian specimens much broader and larger, 8–9 by 5½ in.; in Sikkim and Bhotan ones much smaller and more symmetrical, 3–3½ by 2–3 in.; petiole rarely ¼ in. *Spikes* flexuous; bracts of male pedicelled, the pedicel sometimes elongate; anthers 2 sessile 2-celled. *Fruit* ⅛ in. diam.—The long peduncles at once distinguish this from *P. peepuloides*, which is included with it under Wallich's No. 6654.

20. **P. pothiforme,** *Wall. ex Cas. DC. in Prodr.* xvi. 1. 351; tall, quite glabrous, leaves membranous petioled 7–9 by 3 in. linear-oblong acuminate base oblique cordate, nerves 5 of which 3 run to the tip, fruiting spike 3 in., rachis and fruits coalescing into a fleshy cylindric mass 1 in. diam. P. pothoides, *Wall. Cat.* 6639 B?

BURMA; at Chappedong, *Wallich*.

Habit of the large forms of *P. bœhmeriæfolium*, but the petioles are longer and the fruiting spike very different. Wallich's specimen is the only one known.

†† *Leaves more or less pubescent.* (See also 15. *sylvaticum*.)

21. **P. anisotis,** *Hook. f.*; branches densely shortly tomentose, leaves membranous, subsessile obliquely oblong acuminate from a very unequal auricled base 5–7 nerved from the very base, sparsely hairy above beneath rusty tomentose on the veins especially, fruiting spikes ½ in.

UPPER ASSAM; Thaumathaya, in the Mishmi Hills, *Griffith*.

Habit of the branches of *P. longum*, but the leaves are more unequal-sided and more cordate. *Leaves* 3–5 by 1½–2 in., very thin, finely acuminate, nerves slender, nervules transverse. *Fruiting spikes* cylindric, like those of *P. peepuloides*; peduncle hispidly hairy, slender; bracts minute, peltate. *Fruit* about ⅛ in. diam.

22. **P. aurantiacum,** *Wall. Cat.* 6658 A; stems climbing and rooting glabrous, leaves all petioled coriaceous ovate elliptic- or orbicular-ovate caudate-acuminate 5-nerved hairy or glabrate beneath base rounded or acute, spikes 1½–3 in., stigmas very minute, young fruit angular ripe globose. *Cas. DC. in Prodr.* xvi. 1. 357. Chavica Wallichii, *Miq. Syst. Pip.* 254, and *Ill. Pip.* 38, t. 33, and *Fl. Ind. Bat.* i. 2. 143.

NEPAL; at Sheopore, *Wallich*. ASSAM, from Suddya and elsewhere, *Griffith*.

A rather stout climber, of a yellowish colour when dry; branches not hard or woody, glabrous. *Leaves* or young trailing shoots with petioles 2–3 in. long; leaves on the main stem and branches 3–4 in. long, with petioles ¾–1 in., upper surface almost shining; nerves very slender above, strong beneath; nervules indistinct on both surfaces. *Spikes* drooping, peduncle of both sexes about as long as the petioles; flowers densely crowded; bracts peltate, quite glabrous; stamens 2, anthers reniform, cells confluent dehiscing across the tip; fruiting spikes variable in length. *Fruit* distinctly pyramidal when young and dry, when ripe about ⅙ in. diam., not so crowded as usual in the section from many not ripening. It is curious that this very distinct species has not been collected in Sikkim or Bhotan.

23. **P. Hapnium,** *Ham. in Wall. Cat.* 6650 D; climbing, branches stout rooting warted below, leaves petioled rugose oblong or oblong-lanceolate acuminate 7-nerved above the base nerves beneath pubescent or glabrate, base very unequal auricled on one side, peduncles longer than the leaves, fem. spikes short cylindric. P. Siriboa, *Herb. Heyne in Wall. Cat.* 6651 B. P. nigrum, 6643 C, *the centre specimen only*. Chavica Arnottiana, *Miq. Syst. Pip.* 268, and *Ill. Pip.* 43, t. 40 (*not* P. Arnottianum, *Cas. DC.*).

TRAVANCORE, *Heyne*; Courtallam, *Wight*. "Phuranbari," *Hamilton*.

Branches hoary; warts minute. *Leaves* 3–4 by 1½–2 in., the older ones very rugosely reticulated, basal auricle sometimes incurved and overlapping the petiole, at others absent, nerves impressed above; petiole ⅓–½ in., slender. *Female spike* young, ¾ in. long; peduncle as long hoary.—An obscure but very distinct plant, of which the specimens are insufficient. Miquel unites with it Wallich's 6651 A (P. Chuvya, *Hunter* ?), which is a Siam plant collected by Finlayson and is quite different, having glabrous leaves; it is in too imperfect a state for determination. Cas. De Candolle quotes *Chavica Arnottiana*, Miquel, and Wall. Cat. 6651 A, B, under his *P. Arnottianum*, but describes from Wall. Cat. 6650 E, F, which are unquestionably *P. Chaba*. I do not know where Phuranbari, Hamilton's habitat, is.

** Fruiting spikes globose. Stigmas sessile.

24. **P. brachystachyum,** *Wall. Cat.* 6656, *in part*; quite glabrous, branches slender rigid lower warted, leaves petioled thinly coriaceous elliptic-lanceolate or -ovate obtusely caudate-acuminate 5-nerved, base acute, fruiting spike globose very shortly peduncled. P. vasculosum, *Wall. Cat.* 6660. P. Mullesua & Guigual, *Don Prodr.* 20; *Cas. DC. in Prodr.* xvi. 1. 338, 339. Chavica sphærostachya, *Miq. Syst. Pip.* 279, *Ill. Pip.* 44, t. 42, 43, *in Hook. Lond. Journ. Bot.* v. 551, and *Fl. Ind. Bat.* i. 2. 446, t. 27 B, *excl. var.* β; *Cas. DC. in Prodr.* xvi. 1. 388; *Wight Ic.* t. 1931. C. Mullesua & Guigual, *Miq. Syst. Pip.* 280.

SUBTROPICAL HIMALAYA; from Simla to Bhotan, alt. 2–5000 ft. KHASIA MTS., alt. 3–5000 ft. NILGHIRI HILLS, alt. 5000 ft., *Noton*, &c.

A much-branched twiggy shrub, 5–6 ft. high; branches terete, woody. *Leaves* membranous, rarely coriaceous, 3–7 by 1–3½ in., nerves strong beneath, nervules transverse; petiole slender, ¼–½ in.; young leaves in Kumaon specimens are rounded-cordate. *Male spikes* only seen on Nilghiri specimens, 2–3 in., slender, drooping; bracts minute, peltate; stamens 2; anthers reniform, cells confluent, dehiscing across the tip. *Female spikes* ¼–⅓ in. diam., rachis pubescent. *Fruit* 1/10 in. diam.; stigmas 3, very minute.—Only to be distinguished from *P. peepuloides* by the globose fruiting spikes, having like it the frequently warted branches. Amongst a host of specimens I have not one collected as male in the Himalaya, and suspect that the males are mixed up with those of *P. peepuloides, khasianum* and *nepalense*, which are often undistinguishable in young foliage.

Var. *rhombica*; leaves more coriaceous rhombic-ovate 7-nerved, fruiting spikes larger, ⅓–½ in. diam.—ASSAM, mouth of the Now Dihong River, *Griffith*.

25. **P. Thomsoni,** *Hook. f.*; scandent, quite glabrous, branches stout herbaceous, leaves long-petioled ovate-oblong or -lanceolate acuminate 5-nerved at the rounded or cordate often oblique base, fruiting spike shorter than its peduncle subglobose. Chavica Thomsoni, *Cas. DC. in Prodr.* xvi. 1. 389. C. petiolata, *Cas. DC. l. c., the Khasian specimen.*—Chavica No. 18, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 7000 ft., *Treutler*. KHASIA MTS., alt. 3–4000 ft., *J. D. H. & T. T.* CACHAR, *Keenan*.

Branches as thick as a crow-quill and more, rooting at the nodes, not woody, black when dry. *Leaves* 4–7 by 2½–3½ in., thick, nervules indistinct; petiole 1–2½ in. *Male spikes* 1–2 in., bracts peltate. *Fruiting spikes* very young, ¼ in.—A very distinct-looking species, I think, but hardly in condition for description; the fruiting spikes are too young to judge of their mature form.

*** Fruiting spike long or short. Ovary produced into a distinct style. RHYNCHOLEPIS, *Miq.*

26. **P. rostratum,** *Roxb. Fl. Ind.* i. 160, and *Ed. Carey & Wall.* i. 163; stem erect, branches petioles leaves beneath and peduncles roughly tomentose, leaves large membranous shortly petioled oblong orbicular or somewhat

fiddle-shaped acuminate 7-nerved at the rounded or cordate often unequal base, peduncle short, fruiting spikes short cylindric, style elongate. *Cas. DC. in Prodr.* xvi. 1. 377; *Miq. Syst. Pip.* 284, and *Fl. Ind. Bat.* i. 2. 447. P. stylosum, *Miq. in Ann. Mus. Bot. Lugd. Bat.* i. *fasc.* 5, 139; *Cas. DC. l. c.* 344. P. birmanicum, *Cas. DC. l. c.* 338, *excl. var.* β. Rhyncholepis? Roxburghii, *Miq. Syst. Pip.* 284, and *Fl. Ind. Bat.* i. 2. 447.

MALACCA, *Griffith.* SINGAPORE, *Maingay.*—DISTRIB. Sumatra.

Stem 18 in. from a creeping stock, rusty-tomentose, suberect, dichotomously branched, lower nodes thickened. *Leaves* 5–7 by 2–4 in., base usually narrowed, glabrous or puberulous above, nerves slender; petiole stout, ⅛–¼ in. *Male spikes* not seen. *Fruiting spikes* ½–1 in. long; peduncle very short; bracts orbicular. *Fruit* globose, ⅛–⅙ in. diam.; style very variable in length, as long as the fruit or shorter.—I have not seen authentic specimens of Roxburgh's *P. rostratum*, but there seems no reason to doubt that Miquel's *P. stylosum* is the same.

27. **P. penangense,** *Cas. DC. in Prodr.* xvi. 1. 353; erect, quite glabrous, branches terete, leaves petioled membranous oblong or ovate-lanceolate caudate-acuminate 5-nerved, base acute or subacute, peduncle equalling the very short fruiting-spike, style elongate. P. Lonchites, *Wall. Cat.* 6644 B, *in Herb. Hook. only.* Chavica penangensis, *Miq. Syst. Pip.* 279, and *Ill. Pip.* 45, t. 44 (*not Miq. in Hook. Lond. Journ. Bot.*).

PENANG, *Wallich.* SINGAPORE? *Lobb.*

A shrub; branches hard, smooth. *Leaves* 3–5 by 1½–2 in., nerves slender, alternate, bases rather distant; petiole ¼–⅓ in. *Female spikes* ½ in. or less, peduncle slender; bracts peltate. *Fruits* few 1/10–⅛ in. diam. globose, styles slender equalling their diameter.—Miquel cites *Wall. Cat.* 6642 B for this, no doubt a mistake for 6644 B, which, however, he must have taken from the Hookerian Herbarium, as there is no specimen at all of this species in the Linnæan Society's, where 6642 B is *P. attenuatum.*

Sect. IV. **Pseudochavica.** *Spikes* solitary; flowers diœcious. *Fruits* forming a loose interrupted spike, usually much larger than in Sect. *Chavica;* fruits and stigmas sessile. *Bracts* peltate, orbicular, margins free all round.

28. **P. Hamiltonii,** *Cas. DC. in Prodr.* xvi. 1. 359, *in part*; quite glabrous, shrubby, branches finely striate, leaves petioled coriaceous elliptic or almost rounded obtuse or subacute 5–7-nerved from above the base, bracts orbicular ciliate, fruiting spikes slender, fruit ovoid. P. plantagineum, *Herb. Ham. in Wall. Cat.* 6659 A, B *in part.* P. Betle, *Wall. Cat.* 6652 B, *the two left-hand specimens only*; *Cas. DC. l. c.* p. 359, *in part*; *Miq. Syst. Pip.* 229, *in part.*

SIKKIM TERAI, *J. D. H.* ASSAM, *Simons.* SILHET and KHASIA MTS., *Wallich,* &c. CHITTAGONG; at Seetakoond, *J. D. H. & T. T.*

Stem stout, flexuous, scandent and rooting below; branches subterete or angular. *Leaves* remarkably uniform, 2–3 by 1–2½ in., pale when dry, nerves strong, nervules transverse, base nearly equal, never cordate; petiole ½–1 in. *Male spikes* slender, 1½–3 in.; flowers 2–3-androus. *Fruiting spikes* 4–6 in. flexuous; peduncle ½ in., slender; rachis glabrous, except the ciliate pits.—This is one of the most constant of Indian species in the form of the leaf. The name *P. plantagineum,* Hamilton, has been overlooked by Miquel and Cas. DC., though the type of Wallich's No. 6659. Cas. DC. has described with *P. Hamiltonii* Wallich's 6659 C (misprinted G), which is a very different plant, with caudate-acuminate leaves, and is referred by Miquel (Syst. 225) to *Chavica Siriboa.* It is, I think, neither *Hamiltonii* nor *Siriboa,* and is in too young a condition of flowering to determine.

29. **P. Hookeri,** *Miq. in Hook. Lond. Journ. Bot.* iv. 437; shrubby,

branchlets petioles peduncles and leaves beneath sparsely hirsute, leaves petioled rather coriaceous ovate ovate-oblong or -lanceolate obtusely acuminate 5–7-nerved from the rounded or subcordate equal or oblique base, spikes long slender, bracts orbicular. *Cas. DC. in Prodr.* xvi. 1. 366; *Dalz. & Gibs. Bomb. Fl.* 115.

The CONCAN and CANARA; Mahableshwar and Bababoodan Hills, *Law, Cleghorn*, &c.

Branches stout, terete, angled when dry. *Leaves* 3–5 by 1½–2½ in., brownish when dry, glabrous above, nerves beneath slender, nervules transverse; petiole ¼–¾ in. *Male spikes* 3–6 in., flexuous, peduncle equalling the petiole; bracts glabrous; stamens 2. *Fruiting spikes* 3–6 in.; bracts sometimes adnate below and shortly decurrent; scar glabrous within.—A distinct species, but the fruiting spikes are immature, and the bracts being sometimes decurrent, it should perhaps be removed to Sect. *Eupiper.*

30. **P. Schmidtii,** *Hook. f.*; shrubby, quite glabrous, branches woody terete, leaves petioled very coriaceous ovate-oblong or -lanceolate acuminate 5-nerved from above the base, nerves alternate, base rounded or acute strongly reticulated on both surfaces, peduncles longer than the petioles, male spikes 4–6 in., female shorter fruiting with a very thick flexuous rachis, fruit globose or ovoid, bracts orbicular. P. arborescens, *in part, Miq. Syst. Pip.* 320; *Wight Ic.* t. 1940, *right-hand figure*; *Cas. DC. in DC. Prodr.* xvi. 1. 359, *the Nilghiri plant only.* P. nigrum, *Wall. Cat.* 6643 D, *the lower specimen only.* ? P. arcuatum, γ. quintuplinervium, *Cas. DC. l. c.* 360.

NILGHIRI MTS., *Schmidt, Wight*, &c.

A large shrub, clothing trunks of trees; branches usually drying black. *Leaves* 3–4 by 1–2 in., drying brown; nerves beneath very stout, sometimes whitish beneath, margin often recurved; petiole stout, ⅓ in. *Male spikes* stout, peduncle twice as long as the petiole; female stout, very dense-fld. *Fruiting spike* variable, often tortuous, rachis usually very thick. *Fruit* in some very fleshy and described by Wight as oblong, in others less fleshy and quite globose.—I cannot imagine this to be what Roxburgh intended as the Moluccan *P. arborescens*, and of which he says the peduncles are about as long as the petioles, and which Miquel describes as having puberulous nervules beneath, and short male spikes. The Ceylon plant (C. P. 2461), referred to by Thwaites and Cas. DC. as *P. arborescens*, is *P. argyrophyllum.* Wallich's 6643 E from Penang, referred by Miquel both to *P. arborescens* (Syst. Pip. 320) and to *P. attenuatum* (p. 307), is *P. porphyrophyllum.*

31. **P. nepalense,** *Miq. Syst. Pip.* 318; shrubby, quite glabrous, leaves petioled membranous or thinly coriaceous elliptic-ovate or -oblong or -lanceolate more or less caudate-acuminate 5–7-nerved above the equal or oblique acute or rounded base, male spikes long slender, fruiting spike long or short, rachis densely tomentose, bracts orbicular, fruit ovoid sessile granulate. *Cas. DC. in Prodr.* xvi. 1. 357. P. peepuloides, *Wall. Cat.* 6650 B. —Piper Nos. 5 and 20 (*for the most part*), *Herb. Ind. Or. H. f. & T.*

SUBTROPICAL HIMALAYA, alt. 3–5000 ft., from Garwhal, *Edgeworth*, to Bhotan and Mishmi, *Griffith.* KHASIA MTS., alt. 3–5000 ft., *Griffith*, &c.

Branches slender. *Leaves* very variable, 3–5 by 1–3 in., base rarely rounded or cordate; petiole ⅛–⅜ in. *Spikes* 2–7 in.; bracts sessile. *Fruiting spikes* often 6 in., puberulous, straight or flexuous. *Fruit* ⅛ in. long, pointed.—The commonest Himalayan and Khasian species. No. 20 *Herb. H. f. & T.* appears to be a form with broader and more coriaceous leaves, for the flowers and fruit afford no character.

32. **P. khasianum,** *Cas. DC. in Prodr.* xvi. 349, *in part*; glabrous or peduncles and petioles sparsely pubescent, leaves petioled membranous lanceolate or oblong-lanceolate caudate-acuminate 5-nerved above the equal

acute or rounded base, peduncle longer than the petiole, fruiting spike short, rachis tomentose, bracts orbicular, fruit small globose obscurely pedicelled.

NEPAL? *Wallich.* SIKKIM HIMALAYA, alt. 2–6000 ft., *Clarke.* UPPER ASSAM, *Griffith.* KHASIA MTS., alt. 3–5000 ft., *J. D. H. & T. T.*

It is difficult without the fruit to distinguish this from *P. nepalense*; the leaves are never so large, not exceeding 5 in., and are narrower with much longer often falcately curved points. The spikes are never more than 1½ in., and the small fruits are only ⅛–⅙ in. diam.—I find no specimen of this in Wallich's Herbarium, but good ones in Herb. Hook. received from him. I have retained the name of *khasianum*, though the description in the Prodromus is drawn up in part from *P. Hamiltonii* and from *P. nepalense*, whence the fruit is described as ovoid.

33. **P. Lonchites**, *Roem. & Sch. Syst.* i. *Mant.* 241; quite glabrous, branches woody terete, nodes much enlarged, leaves shortly petioled thinly coriaceous elliptic- or oblong-lanceolate subacute 3–5-nerved from near the base, peduncles longer than the petioles, male spikes ½–1 in., fruiting females 1–2 in. flexuous, rachis tomentose, bracts orbicular. *Miq. Syst. Pip.* 331, *Ill. Pip.* 56, t. 57, and *Fl. Ind. Bat.* i. 2. 454; *Wall. Cat.* 6644 B, *the left-hand and lower right-hand specimens.* Chavica penangensis, *Miq. in Hook. Lond. Journ. Bot.* iv. 433 (*not of Syst. Pip.*).

PENANG, *Porter, Wallich.*

Branches rigid, internodes short. *Leaves* very uniform, 2½–3 by 1–1¼ in., subacute at both ends, tip not at all caudate, nervules reticulate, uppermost oblique and subauricled at the base; *petiole* ¼–⅓ in. *Male spikes* uniformly short; bracts ciliate; female much longer. *Fruits* unripe, sessile, ovoid.—A very distinct species, the authorship of which is attributed in the Prodromus to Miquel, and no allusion made to Roemer and Schultes, who profess to have described from Wallich's No. 6644 B, quoting "P. lanceolatum Roxb." which is inscribed on one of Wallich's tickets. As, however, there are 3 species on the sheet of 6644 B, it is doubtful to which Roemer and Schultes refer.

Sect. V. **Eupiper.** *Spikes* solitary; flowers diœcious, rarely polygamous. *Fruits* forming loosely interrupted spikes usually larger than in Sect. *Chavica*; fruits and stigmas sessile. *Bracts* and bracteoles either wholly adnate to the rachis or with raised membranous margins.

* *Bracts of the female spike forming (when dry) a short hemispheric cup under the ovary, margins not or very slightly raised; bracteoles forming a semilunar ridge above the ovary.*

34. **P. nigrum**, *Linn. Sp. Pl.* 28; quite glabrous, stem stout climbing and rooting terete, leaves petioled coriaceous usually broadly ovate oblong or nearly orbicular base usually rounded and oblique 5–9-nerved above the base, nerves strong alternate, peduncles longer or shorter than the petioles, flowers often polygamous, bracts of female short cupular wholly adnate without raised margins, fruit globose. *Vahl Enum.* i. 329; *Roxb. Fl. Ind.* i. 150, and *Ed. Carey & Wall.* i. 153; *Hunter in As. Research.* ix. 383; *Burm. Fl. Ind.* 13; *Blume in Verh. Bat. Genoots.* xi. 191, f. 11–17; *Wall. Cat.* 6643 A, B, C *in part*, D *in part*; *Miq. Syst. Pip.* 308, *Ill. Pip.* 50, t. 50, *in Hook. Lond. Journ. Bot.* v. 552, and *Fl. Ind. Bat.* i. 2. 451; *Cas. DC. in Prodr.* xvi. 1. 363; *Marsden Sumatr.* t. 1; *Bot. Mag.* t. 3139; *Hayne Arnz. Gewachs.* xiv. t. 6; *Nees Pl. Med.* t. 21; *Woodv. Med. Bot.* iv. t. 246; *Bentl. & Trim. Med. Pl.* t. 245; *Dict. Sc. Nat.* t. 291; *Spach Suites Buff.* t. 125. P. trioicum, *Roxb. ll. c.*; *Miquel Syst.* 310, and in *Hook. Journ.* iv. 438, v. 552; *Wight Ic.* t. 1935. P. nigrum *var.* trioicum, *Cas. DC. l. c.* P. malabarense and P. baccatum (the Indian synonyms only), *Cas.*

DC. l. c. 242. Muldera multinervis & Wightiana, *Miq. in Hook. Lond. Journ. Bot.* v. 557–8.—*Rheede Hort. Mal.* vii. 23, t. 12.

Native in the forests of the CIRCARS and ? of ASSAM and MALABAR; cultivated in hot damp parts of India, Ceylon and the tropics generally.

Branches stout, trailing and rooting at the nodes. *Leaves* 5–7 by 2–5 in., most variable in breadth, sometimes glaucous beneath; base acute rounded or cordate, equal or unequal; nerves stout, 2–3 pairs basal, with another pair higher up which run to the tip; petiole ½–1½ in., stout. *Flowers* usually diœcious, but often the female bears 2 anthers, or the male a pistillode; anthers 2-celled. *Fruiting spikes* very variable in length and robustness, rachis glabrous. *Fruit* globose, sessile, red, pulp thin.—The distinctions, if any, between the wild and cultivated black Peppers (*P. nigrum* and *trioicum*) want careful study, from fresh specimens. Roxburgh, who first distinguished them, gives no other character than that the leaves of *P. trioicum* are glaucous beneath. Miquel, who retained both species in his Systema, observes that *P. trioicum* has less coriaceous narrower more lanceolate leaves, less white beneath, and in the Fl. Ind. Bat. he simply refers to *trioicum* as perhaps the wild form of *nigrum*. Clarke has collected in the Khasia (at Amwee, alt. 3000 ft.) a membranous-leaved pepper otherwise like *P. nigrum* with young female spikes. I have examined authentic specimens of *Muldera Wightiana* and *multinervis* in Arnott's Herbarium, and do not see how they differ from *P. nigrum*; those of *M. Wightiana* are in male flower only. The transversely dehiscing female receptacle of *M. multinervis* described by Miquel seems to me to be formed of the ordinary bracts and bracteoles of *P. nigrum*. I however advance this with hesitation, for our knowledge of the specific limits of *P. nigrum* are as vague as of its geographical.

35. **P. zeylanicum,** *Miq. in Lond. Journ. Bot.* iv. 436; quite glabrous, branches terete stout woody, nodes much thickened, leaves small long-petioled coriaceous broadly ovate or ovate-cordate acuminate 3–5-nerved from the base, nerves and nervules impressed above very prominent beneath, peduncles longer than the petioles, fruiting spikes short robust, bracts adnate tips raised in fruit, fruit globose smooth densely crowded. *Cas. DC. in Prodr.* xvi. 1. 366. P. arcuatum, *Thwaites Enum.* 293, *in part* (C. P. 2177).

CEYLON; in the higher parts of the central province, *Walker*, &c.

Dark brown when dry, much branched. *Leaves* 1½–2½ by 1–1½ in., paler beneath, often bullate above, base usually equal; petiole ½–1 in. *Male spikes* 1–1½ in.; bracts closely imbricate, the lowest sometimes oblong and peltate; stamens 2, filaments very broad. *Fruiting spikes* 1–1½ in., flexuous.—A very distinct-looking species. I do not find the filaments to be margined beneath the anthers as described by Miquel. The *forma major* of that author, from the Deccan (Mayabam, Sir F. Adam), is a very doubtful plant, in fact indeterminable.

36. **P. trineuron,** *Miq. in Hook. Lond. Journ.* v. 555; quite glabrous, branches slender rigid, leaves thin elliptic-lanceolate subacute or acuminate 3-nerved nearly to the tip, peduncles longer than the petioles, male spikes slender shorter than the leaves, male and female bracts closely adnate to the rachis, stamens 2, fruits distant globose quite smooth. *Cas. DC. in Prodr.* xvi. 362. P. insulare & ceylanicum, *Cas. DC. l. c.* 242. Muldera diandra, *Thwaites Enum.* 428 (*omitted in DC. Prodr.*).

CEYLON, in damp forests in the south of the island, *Walker*, *Thwaites*.

Branches slender, black, nodes much enlarged. *Leaves* 3–5 by ¾–1½ in., base acute; principal nerves 1–2 pair, slender; petiole ¼–½ in. *Male spikes* 2–3 in.; bracts semicircular, rather distant. *Fruiting spike* rigid; bracts forming a thick cup; rachis black, naked between the fruits.—This is certainly not a *Muldera*, though it resembles *P. arcuatum*, Blume, of Java.

37. **P. leptonema,** *Hook. f.*; quite glabrous, branches terete firm,

nodes much enlarged, leaves petioled thinly coriaceous broadly elliptic or rounded abruptly acuminate, 5-nerved from near the rounded rarely subcordate base, peduncles slender longer than the petioles, female spikes very slender longer than the leaves, flowers very minute in separate whorls. P. Lonchites, *Wall. Cat.* 6644 B, *the right-hand upper specimen only.*

PENANG, *Wallich, Maingay.*—DISTRIB. Java (*Zollinger*, 3771/8).

Apparently shrubby. *Leaves* very symmetrical for the genus, dull brown when dry, 3–4 by 2–3 in., nerves slender, nervules distinct on both surfaces; petiole slender, ½ in. *Female spikes* alone seen; flowers sometimes in a broken spiral, but usually in distinct whorls; bracts cupular, confluent below with the slender quite glabrous rachis. *Fruit* ⅙ in. long, ellipsoid, with a very short style when dry.—A very distinct species, which Miquel appears to have overlooked in Wallich's Herbarium, where the only specimen is fastened on a sheet with two other species (*P. caninum* and *Lonchites*). In the Hookerian Herbarium he has named it "a *P. acre*, Bl., vix diversum;"—it differs from *P. acre* totally in the bracts and flowers.

** *Bracts of the female spike adnate to the rachis with decurrent raised more or less membranous margins which are confluent with the bracteoles on either side of the ovary.* (The species of this group are involved, and I have failed in the attempt to dissociate Nos. 40 to 43.)

38. **P. rhytidocarpum**, *Hook. f.*; a stout quite glabrous climber, leaves long-petioled large coriaceous elliptic ovate oblong or orbicular acuminate not glaucous beneath 3–5-nerved above the rounded acute or cordate base, spikes very long, fruiting females 8–12 in., bracts with slightly raised margins, fruit granulate (when dry). P. aurantiacum, *Wall Cat.* 6658 B. P. nigrum, *var.* macrostachyum, *Cas. DC. in Prodr.* xvi. 1. 363.

ASSAM, SILHET and the KHASIA MTS., ascending to 4000 ft., common, *Wallich, Griffith*, &c. CHITTAGONG, *J. D. H. & T. T.*

Habit and foliage of *P. nigrum*, but distinguished by the long petioles, often 2 in. long, larger leaves, attaining 7 in. in breadth, very long spikes, raised margins of the bracts and granulate fruit.—Miquel has named a specimen without fruit in Herb. Hook. as *P. trioicum*? and alludes to it in Syst. Pip. (314, parag. 3).

39. **P. attenuatum**, *Ham. in Wall. Cat.* 6642 B, C, D *in part*; branches soft compressed angled and grooved when dry, leaves long-petioled membranous orbicular-ovate or cordate abruptly acuminate upper more ovate glabrous or puberulous beneath 7-nerved from near the base, fruiting female spikes very long slender, bracts decurrent with raised membranous margins, fruit small globose. *Miq. Syst. Pip.* 306, *Ill. Pip.* 49, t. 49, and in *Fl. Ind. Bat.* i. 2. 451; *Cas. DC. in Prodr.* xvi. 1. 363; *Wight Ic.* t. 1933. ? P. Sirium, *Cas. DC. l. c.* 361. P. Malamiris, *Roxb. Fl. Ind.* i. 160, and *Ed. Carey & Wall.* i. 162.

EASTERN TROPICAL HIMALAYA; Sikkim, *J. D. H.*, &c.; Bhotan, *Griffith.* ASSAM, SILHET and the KHASIA MTS., *Hamilton*, &c. NILGHIRI HILLS; on the Eastern slopes, *Wight*, &c.—DISTRIB. ? Penang and Java.

Apparently a rambling species, not unlike *P. sylvaticum*. *Branches* stout, but evidently soft, flexuous, glabrous. *Leaves* 2½–6 in., often as broad as long, from finely downy to glabrous beneath; base usually equal rounded truncate or cordate, of the upper usually acute; nerves slender; petiole 1–3 in., rarely shorter. *Male spikes* slender; bracts adnate, cupular; bracteoles slender; stamens 2–4. *Female spikes* very slender, lengthening in fruit to 9 in.; rachis glabrous, except in the ciliate scars left by the fruit; ovaries ovoid; stigmas minute. *Fruit* globose, ⅛ in. diam.—The 7 basal nerves seem to distinguish this from the following. Cas. DC. refers the *Sirium* of Rumph (V. 119, t. 2) and Vahl's *P. diffusum* to it, but the evidence is very slight. According to Miquel, a specimen of Roxburgh's *P. Malamiris* so named by himself in Delessert's Herbarium is this; unfortunately Roxburgh's names of *Polygonums* and *Peppers* are often at issue both with his descriptions, and these again with his Icones; he quotes Linnæus for his *Malamiris*, but Linnæus includes plants of both the old and new worlds under *Malamiris*. Rheede's figure of Linnæus' plant of that name, Amalago (vii. t. 16), cited by Roxburgh, cannot well be *P. attenuatum*.

40. **P. sylvestre,** *Lamk. Ill.* 79 ? ; quite glabrous, branches subterete, leaves petioled hardly coriaceous elliptic or ovate acuminate base acute rounded or subcordate 5-nerved from near the base, spikes long very slender, bracts of male cupular adnate to the rachis, of the female with raised margins glabrous within, rachis glabrous, fruit globose. *Miq. Syst. Pip.* 314, and in *Hook. Lond. Journ. Bot.* iv. 438, and v. 552; *Thwaites Enum.* 293 (C. P. 3688); *Cas. DC. in Prodr.* xvi. 1. 361; *Wight Ic.* t. 1937.

Assam and Silhet, *Wallich, Griffith.* Deccan Peninsula, at Courtallam, *Wight.* Ceylon, *Walker*; south end of the island, *Thwaites.*

A branching climbing shrub, with apparently soft branches, much compressed and furrowed when dry in the Ceylon specimens. *Leaves* 4–5 by 2–3 in., more coriaceous than in *P. attenuatum*, with much shorter petioles, and never rounded-ovate as in that plant, base acute or rounded rarely cordate, nerves not so basal; petiole ⅛–⅜ in. *Male spikes* 5–6 in., flowers rather distant; stamens 2–4; female lengthening much in fruit, rachis slender, glabrous. *Fruit* ⅛ to nearly ¼ in.—I accept this as Lamarck's *P. sylvestre* with great doubt, and I find it difficult to define it by description from narrow-leaved forms of *P. attenuatum*, and from some states of *P. argyrophyllum*, but feel sure it is quite distinct from the former. A specimen in Wight's Herbarium is marked *P. trioicum*, as is another from Roxburgh's Herbarium, but the fruit seems too small for that form of *nigrum*, the rachis too is slender, and leaves too membranous. I refrain from citing any of the extra-Indian descriptions or habitats for *sylvestre*, but there is in Herb. Hook. a plant said to be from Mauritius which tallies with this, and is marked *P. sylvestre* by Miquel; it is probably a garden specimen, and is in male fl. only.

41. **P. Hymenophyllum,** *Miq. in Hook. Lond. Journ. Bot.* v. 554; petioles and leaves beneath pubescent with crisped hairs, branches terete, leaves shortly petioled very membranous ovate elliptic-ovate or -oblong or ovate-cordate acuminate base acute or rounded 2–3-nerved towards the base, nerves slender alternate, spikes very long and slender, fruiting rachis very slender glabrous or pubescent in the scars, bracts confluent with the rachis. *Cas. DC. in Prodr.* xvi. 1. 364; *Wight Ic.* t. 1942. B. Malamiris, *Wall. Cat.* 6642 G, H. P. nilghirianum, *Cas. DC. l. c.* P. lanatum, *Wight mss.*; *Miq. l. c.* 553 (*not of Roxb.*). P. Wightii, *Miq. in Hook. Lond. Journ. Bot.* v. 552 *for the most part.*

Deccan Peninsula; on the Nilghiri, Shevagherry and Travancore Mountains, *Wight*, &c.

A slender climber, with branches that do not appear to shrink in drying. *Leaves* 3–5 in., very variable in breadth, always thinly membranous, base usually equal; petiole ¼–½ in. *Male spike* very slender; bracts with free rounded tips, peduncle longer or shorter than the petiole. *Fruiting spikes* 3–6 in., rachis very variable; bracts usually inconspicuous being entirely confluent with the rachis, but sometimes they have more or less conspicuously raised margins and are ciliated within. *Fruit* oblong when unripe, with often a distinct style, globose and ⅙–¼ in. diam. when ripe.—Wight, not having seen male plants, is disposed to regard this as the female of *P. argyrophyllum*, and though males are now known, they do not help to distinguish them. The pubescence, which is the best character for this, is far from constant in amount, and is sometimes almost evanescent. So too the development of the bracts in the fruiting rachis is very various. A Javan plant of Zollinger's (II. No. 304) closely resembles this.

42. **P. argyrophyllum,** *Miq. Syst. Pip.* 330, *Ill. Pip.* 55, t. 56, and

in *Hook. Lond. Journ. Bot.* v. 555; quite glabrous, shrubby, branches terete, leaves petioled membranous or coriaceous lanceolate or elliptic- or ovate-lanceolate acuminate sometimes silvery beneath 5-nerved above the base, nerves distant alternate, base acute often oblique, male spikes very slender, peduncles longer than the petioles, fruiting spike 3–6 in., bracts usually decurrent with raised margins, scars naked or ciliate. *Cas. DC. in Prodr.* xvi. 1. 365; *Wight Ic.* t. 1941. P. Malamiri, *Wall. Cat.* 6642 E, F, I. P. Wightii, *Miq. in Hook. Lond. Journ. l. c.* 552, *in part.*

Deccan Peninsula, *Heyne*; Travancore Mts., *Wight.* Ceylon; in the central province.

Some states of this appear to differ from *P. Hymenophyllum* only in being glabrous, others have the much more coriaceous foliage of other forms, and the leaves are normally more whitel beneath. There is so much variation in the development of the bracts that possibly there is more than one species here. The following appear to me to be probably varieties of this.

1. *P. argyrophyllum proper*; leaves long 4–6 by 1¼–2 in. whitish beneath, petiole nearly 1 in., peduncle very slender, fruiting spike ¼–2½ in., rachis very slender glabrous, bracts almost confluent with the rachis, fruit small ⅛ in. diam. *Wall. Cat.* 6642 F.—This was sent to Wallich by Wight, but I find no specimen in the Herbarium of the latter. There are, however, good ones in Arnott's Herbarium.

2. Leaves smaller shorter petioled more elliptic sometimes bullate not white beneath, fruiting spikes 5–7 in., rachis slender, bracts with raised margins, scars distant with fimbriate edges, young fruit oblong subtruncate with a distinct style globose when ripe. *Wall. Cat.* 6642 E, I.—Courtallam, *Wight.* Concan ?, *Stocks.*

3. Leaves elliptic more coriaceous less acuminate not white beneath, bracts with conspicuous sinuate raised margins which embrace the bases of the young fruits, ripe fruit globose ¼ in. diam. P. nepalense, *Wight Ic.* t. 1938 (*not of Miquel*).—Courtallam, in dense forests.—This resembles *P. sylvestre* in the form of the leaf, and *P. Wightii* in their texture.

4. Leaves coriaceous 3–5 by 1⅓–2½ in. elliptic-lanceolate acuminate bullate above silvery beneath, nerves stronger more distant, petiole ⅓ in., fruiting spikes 4–6 in., bracts with raised sinuate margins, fruit large "yellow" (*Clarke*). P. argyrophyllum, *Thwaites Enum.* 293.—Nilghiri Hills, alt. 7000 ft., *Clarke.* Ceylon (C.P. 3625).—This should perhaps be referred to *P. Wightii*, but the alternate nerves are very constant.

5. Leaves much smaller 2–2½ by 1 in. elliptic-lanceolate, petiole short ¼ in., fruiting spikes 1–2 in. slender, rachis slender, bracts with hardly raised margins, scars ciliate, fruit ⅙ in. diam.—Nilghiri or Kurg Hills, *G. Thomson.*—This very small form a little resembles *P. khasianum.*

6. Leaves thinly coriaceous elliptic-lanceolate or oblong ovate silvery or not beneath, fruiting spikes 2–7 in., bracts with raised sinuate margins, rachis rather slender, fruit globose ⅙ in. diam. P. Walkeri, *Miq. in Hook. Lond. Journ. Bot.* iv. 439; *Cas. DC. l. c.* 8362. P. arborescens, *Thwaites Enum.* 298, *excl. syn.*—Ceylon, *Walker, Thwaites* (C. P. 35 in part, and 2461).—I do not find the minute hairs described by Miquel.

43. **P. Wightii,** *Miq. in Hook. Lond. Journ. Bot.* v. 552, *in part*; quite glabrous, branches stout terete, leaves petioled coriaceous broadly ovate or orbicular rarely elliptic or oblong often glaucous beneath base rounded or cordate, rarely acute 5–7-nerved near the base, spikes 2–3 in. stout, bracts with prominent sinuate margins. *Wight Ic.* t. 1939 (*P. Wightiana on plate*). P. nigrum, *Wall. Cat.* 6643 D, *the upper right-hand specimen only.*

Nilghiri and Travancore Hills, *Wight*, &c.

The robust habit, broader leaves with stronger more basal nerves, longer petioles, and often stouter fruiting-spikes with almost winged bracts, best distinguish this from the coriaceous-leaved plants referred to *P. argyrophyllum*. Whether, however, what I have described above should be regarded as Miquel's *P. Wightii* is perhaps doubtful, there being much confusion in both Wight's and Arnott's Herbaria, where alone authentic specimens of Miquel's plants are preserved. Miquel's description of leaves sparsely hairy on the nerves, together with specimens named by Miquel *P. Wightii* in Herb. Arnott with this character, obviously apply to *P. Hymenophyllum*; others equally authentically named *P. Wightii*, and quite glabrous, with membranous leaves, are identical with forms of *P. argyrophyllum* (perhaps *sylvestre*); whilst still a third series, with coriaceous leaves and more basal stronger nerves, also named *Wightii* by Miquel, represent that plant as here limited. Furthermore, specimens of this last in Arnott's Herbarium are named by Miquel "*P. nigrum forma sylvestre.*" In short the confusion is inextricable, and I cannot say whether *P. sylvestre*, *argyrophyllum*, *Hymenophyllum* and *Wightii* represent as many species, or fewer, or one only. Lastly, *P. Wightii* must be carefully distinguished from *P. Schmidtii* (*P. arborescens Miq. not of Roxb.*), which though not easily distinguishable by words is a very different species.

44. **P. leptostachyum,** *Wall. Cat.* 6649; quite glabrous, branches stout contracted angled and grooved when dry, leaves large coriaceous petioled obliquely ovate oblong-ovate or -lanceolate acuminate 5-nerved above the base, nervules transverse, fruiting spike 7 in., peduncle much longer than the petiole, rachis stout glabrous, bracts with obscure margins, scars glabrous. *Miq. Syst. Pip.* 315. P. indicum, *Miq. fid. Cas. DC. Prodr.* xvi. 1. 498.

BURMA; banks of the Attran River, *Wallich.*

Branches white when dry, internodes long, nodes hardly swollen. *Leaves* very pale, 5-8 by 2-4 in., base acute rounded or cordate; petiole stout, ⅓-1 in. *Spikes* pendulous, scars narrow. *Fruit* scattered, globose, unripe with a distinct style, ripe globose ⅛ in. diam.—A very handsome species, of which the male is unknown. Cas. DC. changes Wallich's name to *P. indicum*, citing as the authority Miquel's Systema (p. 315), where, however, the name *leptostachyum* is preserved, and I find no authority in Miquel for the name *P. indicum*. The *P. leptostachyum* of A. Richard is undescribed, and only mentioned in Grisebach's Cat. Pl. Cub. 69. Miquel's citation of Wall. Cat. 1640 for this is an error.

Sect. VI. **Heckeria.** *Spikes* subumbellate. *Flowers* 2-sexual.

45. **P. subpeltatum,** *Willd. Sp. Pl.* i. 166; shrubby, branches very stout soft, leaves very large long-petioled membranous orbicular-cordate glabrous or puberulous beneath, nerves flabellate, spikes erect. *Cas. DC. in Prodr.* xvi. 1. 333; *Vahl Enum.* i. 337, *excl. syn. Lam.*; *Wall. Cat.* 6638. Heckeria subpeltata, *Kunth in Linnæa* xiii. 171. Pothomorphe subpeltata, *Miquel Syst. Pip.* 213, *Ill. Pip.* 29, t. 26, *in Hook. Lond. Journ. Bot.* iv. 431, and *Fl. Ind. Bat.* i. 2. 437; *Wight Ic.* t. 1925.

DECCAN PENINSULA; from the Concan Hills, alt. 5000 ft., southwards, *Heyne Wight*, &c. PENANG, *Wallich*. CEYLON, ascending to 4000 ft., *Walker*, &c.—DISTRIB. Malay Islands, Tropical Africa and Madagascar.

A succulent shrub, 4–5 ft. high, with very thick stem and branches. *Leaves* a foot diam. or less, acute or tip rounded, deeply cordate with a narrow sinus; petiole 6–10 in., with a narrow deciduous wing. *Spikes* 3–7 together, 3–5 in. long, very shortly pedicelled; bracts pedicelled, peltate, triangular or ½-lunar, ciliate; flowers very minute; stamens 2; stigmas 3. *Fruit* very minute, trigonous, cuneiform, truncate.

UNDETERMINABLE AND EXCLUDED SPECIES.

P. AMALAGO, *Linn. Fl. Zeyl.* No. 28.—Miquel (*Syst. Pip.* 258) correctly observes that Linnæus' Amalago is a mixture of various species from the old and new worlds. The *Amalago* of Rheede (vii. t. 16) with elliptic leaves and very long peduncles is not recognizable.

P. ARBORESCENS, *Roxb. Fl. Ind.* i. 159, and *Ed. Carey & Wall.* i. 161.—To this Miquel refers Wallich's No. 6643 E, a native of Penang, which is a flowerless barren state with variegated leaves of a plant called *Cissus ? porphyrophyllus* by Lindley. At p. 307, however, he refers the same number to *P. attenuatum*. He also refers a Nilghiri plant of Perrottet to it; this plant I have not seen, but assume it to be *P. Schmidtii*. Lastly he figures his *P. arborescens* (Ill. Pip. 54, t. 54), but does not state where the figured specimen comes from. The only authority for Roxburgh's plant is his citation of Rumph (V. t. 28, f. 1), which is not recognizable as depicting any of the above-mentioned plants.

P. ARCUATUM, *Blume*, var. nervis remotioribus, *Miq. Syst. Pip.* 334; from the Nilghiri Mts., Perrottet.—This is, I assume, the *P. arcuatum* var. *β. quintuplinervium*, Cas. DC. in Prodr. xvi. 1. 360. It is probably *P. Schmidtii*.

P. ARANEUM, *Wall. Cat.* 6661; from Taoung-dong in Ava, has neither flower nor fruit, and is indeterminable.

P. CLYPEATUM, *Wall. Cat.* 6655 (P. obtusissimum and P. manillanum, *Miq. Syst. Pip.* 337, 339)—are both species of *Ficus*.

P. CORIACEUM, *Vahl Enum.* i. 314, is doubtfully referred to *P. Cubeba* by Miquel (Syst. Pip. 289), and omitted by Cas. DC.

P. DIFFUSUM, *Vahl Enum.* i. 333, from Ceylon, is referred by Cas. DC. (Prodr. xvi. 1. 364) to *P. attenuatum*, but I have seen no specimen of this from Ceylon. Cas. DC. omits this habitat, as does Miquel (Syst. Pip. 327), who gives Java and Amboyna.

P. EXASPERATUM, *Vahl Enum.* i. 322; *Cas. DC. in DC. Prodr.* xvi. 1. 378. (Chavica ? exasperata, *Miq. Syst. Pip.* 275), is indeterminable.

P. FALLAX, *Vahl Enum.* 335, is doubtfully referred by Cas. DC. to *P. nigrum* var. *trioicum*, and by Miquel to *P. longum* or *P. sarmentosum* (*Syst. Pip.* 241).

P. LÆVE, *Vahl Enum.* i. 332; *Cas. DC. in Prodr.* xvi. 1. 362; *Miq. Syst. Pip.* 335, is indeterminable.

P. MALAMIRIS, *Linn. Sp. Pl.* 29; *Vahl Enum.* i. 327 (see Nos. 15, 39, 41, 42).

P. NIGRUM ?, *Wall. Cat.* 6643 E, F; from Malacca, Singapore and Penang.—These are young plants, with broadly cordate rounded leaves variegated green white and purple, of a *Piper*, species unknown, and are the Cissus ? porphyrophyllus, *Lindl. in Journ. Hort. Soc.* i. 225, and *Flore des Serres Ser.* 2, iv. t. 1491. It is *P. porphyrophyllum, N. E. Brown in Gard. Chron.* (1884) xxii. 488.

P. POTHOIDES, *Wall. Cat.* 6639 A; *Cas. DC. in Prodr.* xvi. 1. 351 (Chavica pothoides, *Miq. Syst. Pip.* 266).—There are two species on this sheet, neither in flower or fruit. Of one of these there is a specimen in Herb. Kew from the Andamans, collected by Kurz, in an equally imperfect state.

P. RETROFRACTUM, *Vahl Enum.* i. 314; *Cas. DC. in Prodr.* xvi. 1. 378 (Chavica retrofracta, *Miq. Syst. Pip.* 275), is indeterminable.

P. SUIPIQUA, *Ham. in Don Prodr.* 20; *Cas. DC. in Prodr.* xvi. 1. 378 (Chavica Suipiqua, *Miq. Syst. Pip.* 275), is no doubt a common Nepal species, but I cannot guess which.

P. SYLVESTRE, *Lour.*; *Vahl Enum.* i. 326, is evidently a mixture.

P. SYRINGÆFOLIUM, *Vahl Enum.* i. 328; *Cas. DC. in Prodr.* xvi. 1. 378 (Chavica syringæfolia, *Miq. Syst. Pip.* 275), is indeterminable.

P. THERMALE, *Vahl Enum.* i. 328; *Cas. DC. in Prodr.* xvi. 1. 3378 (Chavica thermalis, *Miq. Syst.* 276), from hot springs at Tranquebar, should be obtained and determined by botanists in Madras by means of the locality.

P.? VENUSTUM, *Wall. Cat.* 6666; *Cas. DC. in Prodr.* xvi. 1. 378, from Singapore, is a *Pothos* in a very young state, not distinguishable from *P. remotiflorus*, Hook., of Ceylon.

P. ZUCCARENII, *Cas. DC. in Prodr.* xvi. 1. 365, from India, *Griffith* in Herb. Munich, is indeterminable. The petiole is described as sheathing throughout its length, which I have not observed in any Indian Piper. It is probably a *Pothos*.

3. **PEPEROMIA**, *Ruiz & Pav.*

Annual or perennial, usually succulent herbs. *Leaves* alternate opposite or whorled, quite entire, pellucid-punctate, exstipulate. *Spikes* terminal or leaf-opposed, solitary or fascicled, rarely axillary. *Flowers* 2-sexual, minute, sessile or sunk in the rachis, often whorled, erect, bracteate. *Perianth* 0. *Stamens* 2, very short; anther-cells confluent. *Ovary* obtuse acute or beaked, 1-celled; stigma lateral or terminal, usually penicillate; ovule 1, erect. *Fruit* minute, indehiscent. *Seed* with a membranous testa.—Species 3–400, chiefly tropical and American.

* *Leaves alternate.* (See also *P. Wightiana.*)

1. **P. exigua,** *Miq. Syst. Pip.* 77, and *Fl. Ind. Bat.* i. 2. 432; quite glabrous, stem very slender decumbent, leaves alternate petioled rounded-ovate-cordate or subdeltoid 5–7-nerved, tip rounded, spikes solitary axillary and terminal, fruit sessile, stigma terminal. *Cas. DC. in Prodr.* xvi. 1. 403. Micropiper exiguum, *Miquel Comm. Phyt.* 56, t. 9 D. Piper exiguum, *Blume in Verh. Bat. Genoots.* xi. 232. P. hyalinum, *Wall. Cat.* 6662.

BURMA; hills opposite Prome, *Wallich.*—DISTRIB. Java, Philippines, ? West Africa.

Stems 3–6 in., sparingly branched. *Leaves* hyaline when dry, ½–1 in. diam., base sometimes truncate; petiole ⅙–1 in. *Spikes* ½ in., filiform. *Fruit* ovoid, beaked.

2. **P. moulmeiniana,** *Cas. DC. in Seem. Journ. Bot.* 1866, 140, and in *DC. Prodr.* xvi. 1. 415; quite glabrous, stem succulent straggling, leaves alternate shortly petioled elliptic-lanceolate obtuse 5-nerved from the base, spikes slender panicled, fruit globose, stigma minute.

TENASSERIM; at Moulmein, *Parish.*

Stems tufted, 6–8 in. high, sparingly branched; branches divaricate. *Leaves* 2–2½ in. long, succulent, nerves faint; petiole ¼–⅓ in. *Spikes* 1–1½ in. *Fruit* not so broad as the rachis.

3. **P. pseudo-rhombea,** *Cas. DC. in Prodr.* xvi. 1. 440; quite glabrous, stem stout erect succulent, leaves alternate petioled fleshy elliptic-lanceolate acute 3-nerved, spikes solitary axillary and terminal shorter than the leaves. P. courtallensis, *var. β., Thwaites Enum.* 292.

CEYLON; Central Province, alt. 3–5000 ft., *Thwaites.*

Stem simple, 1 foot high, as thick as a goose-quill. *Leaves* 2 in., narrowed into the short petiole, nerves obscure.—I have seen but one specimen, and in young flower only.

4. **P. Thomsoni,** *Hook. f.*; quite glabrous, erect, branched, leaves alternate petioled elliptic-ovate subacute 5-nerved, spikes slender axillary and terminal. Peperomia No. 9, *Herb. Ind. Or. H. f. & T.* Piper ovalifolium, *Wall. Cat.* 6663 B, *the lower specimen.*

DECCAN PENINSULA; Nilghiri or Kurg Mts., *G. Thomson*; Courtallam, *Wight*; Dindigul, alt. 2500 ft., *Wight in Herb. Wall.* ? CEYLON, *Thwaites.*

Stem very stout, erect or ascending at the base, naked below, as thick as a swan's quill; branches all reaching about the same height, leafy. *Leaves* all alternate, 2–3 in. long, succulent, 3 principal nerves broad; petiole ½–⅔ in. *Spikes* when flowering as long as the leaves, much longer in fruit.—A specimen of this in Herb. Arnott is mentioned by Miquel (in Hook. Lond. Journ. Bot. v. 549) as a glabrous, luxuriant, alternate-leaved var. of *P. dindigulensis*, from which it appears to me to be widely different, and to be very near *pseudo-rhombea* of Ceylon.

** *Leaves mostly opposite or whorled.*

5. **P. Wightiana,** *Miq. in Hook. Lond. Journ. Bot.* v. 548; suberect, rather slender, glabrous or with the tips of the leaves ciliolate, leaves opposite and alternate petioled obovate elliptic oblong or orbicular obtuse, 3-nerved, spikes 1–3 usually terminal. ? P. Wightiana, *Cas. DC. in Prodr.* xvi. 1. 420. P. ceylanica, *Miq. l. c.* 550; *Cas. DC. l. c.* 457.

The CONCAN, on trees, *Stocks.* MALABAR, *Wight.* NILGHIRIS, *G. Thomson.* CEYLON, *Walker*; Central Province, alt. 6000 ft., *Thwaites* (C. P. 3954).

Stems 6–10 in., straggling and rooting below, glabrous or puberulous. *Leaves* ¼–1 in., very variable, rarely obovate, succulent, glabrous except at the tip; petiole ¼–½ in. *Spikes* 1–2 in., very slender, sometimes paniculate.—Cas. DC. describes the stem as pubescent, but it is glabrous in authentic specimens (in Herb. Arnott), and Miquel does not describe it as pubescent. Wight's figure is, I think, taken from *P. dindigulensis*. I suspect this is only a variety of *P. Heyneana*. Specimens from the Nilghiris have all the leaves alternate. Miquel's *P. ceylanica* has most minute pubescence on the branches; the leaves are chiefly opposite.

6. **P. dindigulensis,** *Miq. Syst. Pip.* 122, *in Hook. Journ. Bot.* v. 549, and *Ill. Pip.* 19, t. 13; stem and leaves pubescent, leaves opposite rarely alternate or 3-nately whorled petioled elliptic-ovate or rounded obtuse or acute 3–5-nerved, spikes slender axillary and terminal solitary or panicled. *Cas. DC. in Prodr.* xvi. 1. 442; ? *Wight Ic.* t. 1921. P. Heyneana, *Wight Ic.* t. 1922; *Thwaites Enum.* 292. ? P. Wightiana, *Wight Ic.* t. 1924. P. Thwaitesii, *Cas. DC. l. c.* 448. Piper ovalifolium, *Wall. Cat.* 6663 A and B (*except the lower specimen*).

DECCAN PENINSULA; from the Concan southward, in the moist ghats.

Very variable, sometimes 18 in. high, with a stem as thick as a goose-quill and suberect, at others more slender and straggling; stem simple or branched. *Leaves* 1–1½ in., succulent, narrowed into the petiole. *Spikes* 1–3 in. long.—I find nothing answering to Wight's figure of *P. Wightiana* in his or Arnott's Herbarium; its alternate leaves resemble *P. Wightiana*, but the hairiness is that of *P. dindigulensis*. His figure of *P. dindigulensis* represents a glabrous plant, unlike any species I have seen; but for its opposite leaves I should refer it to *P. Thomsoni*. I have seen no specimens of *P. Thwaitesii*, Cas DC., but the description entirely accords with *P. dindigulensis*.

7. **P. portulacoides,** *A. Dietr. Sp. Pl.* i. 172; quite glabrous, tufted, stem very stout branched and succulent, leaves opposite or the upper whorled petioled obovate or subrhomboid tip rounded 3-nerved, spikes stout longer than the leaves axillary and terminal. *Miq. Syst. Pip.* 130, and in *Hook. Lond. Journ. Bot.* v. 550; *Cas. DC. in Prodr.* xvi. 1. 443; *Wight Ic.* t. 1922. P. Candolleana, *Miq. Syst.* 146. Piper portulacoides, *Lamk. Ill.* 82; *Vahl Enum.* i. 350. P. trifolium, *Herb. Willd.*

TRAVANCORE mountains; at Courtallam, *Wight.*—DISTRIB. Mauritius, Bourbon, Madagascar, Seychelles.

Stem erect from a creeping base, sometimes as thick as a swan's quill, leafy. *Leaves* all opposite, 1–2 in. long, very variable in width and thickness, very succulent; petiole ¼–½ in. *Spikes* 1–2 in., axillary and terminal.

Var. *courtallensis*; smaller, leaves narrower. P. courtallensis, *Miq. in Hook. Lond. Journ. Bot.* v. 594; *Cas. DC. in Prodr.* xvi. 1. 468. Courtallam, *Wight.*—I see no material difference between this and *P. portulacoides*; and they inhabit the same locality.

8. **P. confusa,** *Hook. f.*; quite glabrous, stem and branches diffuse creeping and rooting, leaves subsessile succulent opposite and 3-nately whorled oblong obtuse 3-nerved narrowed at the base, spikes axillary and terminal panicled stout erect more or less thickened upwards. P. courtal-

lensis, *Thwaites Enum.* 292, and *Cas. DC. in Prodr.* xvi. 1. 463 (*not of Miquel*).

CEYLON; Central Province, alt. 3–5000 ft., *Gardner, Thwaites* (C. P. 2173).

Stems 6–10 in. long, diffusely branched, as thick as a crow-quill, naked below, rooting at the distant nodes. *Leaves* ¾-1 in., narrowed into a very short petiole. *Spikes* ½-⅝ in., stoutly peduncled; obtuse.—This is the *P. courtallensis* of Cas. DC., who cites Miquel, but omits the Continental Indian localities where *P. courtallensis* proper alone is found, and the number (831) which he quotes is of Gardner's (not Thwaites') collection. This differs from *P. portulacoides* in habit, and the form of the subsessile leaves, and the spikes.

9. **P. Heyneana,** *Miq. Syst. Pip.* 123; quite glabrous, stem diffusely branched creeping and rooting, leaves opposite and 3–4-nately whorled petioled linear- or obovate-oblong obcuneate or obcordate rarely orbicular 3-nerved, spikes slender axillary terminal and panicled. *Cas. DC. in Prodr.* xvi. 1. 453. Piper oblongum, *Wall. Cat.* 6663-C?

SUBTROPICAL HIMALAYA; from Kumaon, alt. 3500 ft., *Strachey & Winterbottom*, to Sikkim, alt. 5–6000 ft. KHASIA MTS., alt. 4–5000 ft., *J. D. H. & T. T.* Patkoye Mts. in UPPER ASSAM, *Griffith*.

A small prostrate tufted very variable species. *Stem* 4–10 in. long, rather slender. *Leaves* ¼–1½ in. long, thinly fleshy, drying green; petiole ⅛–⅓ in. *Spikes* ½–1½ in. —It is unfortunate that Miquel should have attached the name of Heyne to a species which Heyne never saw, and which grows very far from the region which that author rendered botanically classical.

10. **P. reflexa,** *A. Dietr. Sp. Pl.* i. 180; stem pubescent stout densely branched and tufted leafy, leaves sessile or shortly petioled coriaceous 4-nately whorled orbicular or nearly so 3-nerved pubescent beneath or glabrate, spikes solitary axillary and terminal stout much exceeding the leaves. *Miq. Syst. Pip.* 169, *in Hook. Lond. Journ. Bot.* iv. 426, *Fl. Ind. Bat.* i. 2. 436, and in *Mart. Fl. Bras.* iv. 17; *Wight Ic.* t. 1933. P. reflexa, *vars.* ζ Berlandieri & η. parviflora, *Cas. DC. in Prodr.* xvi. 1. 452. Piper saxatile, *Wall. Cat.* 6664. P. pusillum, *Blume in Verh. Bat. Nat. Genoots.* xi. 382, f. 37. Micropiper pusillum, *Miq. Comm. Phyt.* t. 5.

SUBTROPICAL HIMALAYA; from Garwhal, alt. 4–6000 ft.; *Edgeworth*, to Sikkim, ascending to 7000 ft., and to UPPER ASSAM, *Griffith*. KHASIA MTS., alt. 4–6000 ft. TRAVANCORE, at Courtallam, *Wight*. CEYLON, Central Province, ascending to 6000 ft.—DISTRIB. Malay Islands, China, Australia, Africa, America.

Stem or branches 8–10 in., rooting at the lower nodes, lower as thick as a goose-quill in Courtallam specimens, which are nearly glabrous, more slender in others. *Leaves* very uniform, rarely opposite or 6-nate, ⅓ in. long, rarely more, sometimes elliptic, lower shortly petioled, wrinkled and yellowish when dry. *Spikes* ½–1½ in., stoutly pedicelled, obtuse.

ORDER CXXV. CHLORANTHACEÆ.

Herbs shrubs or trees, usually aromatic. *Leaves* opposite, usually toothed, petioles often connate and forming a sheath; stipules small, subulate. *Flowers* in terminal or pseudo-axillary spikes, heads or panicles, 1-sexual (one of each sex sometimes cohering). FL. ♂. *Perianth* 0. *Stamens* 1 or 3 connate, filaments very short and thick; anthers 2-celled, or the lateral when 3 are connate 1-celled. FL. ♀. *Perianth* 0, or adnate to the ovary, with a 3-toothed limb. *Ovary* 1-celled; style very short linear or subclavate or 0; ovule 1, orthotropous, pendulous from the top of the cavity. *Drupe* small ovoid or globose. *Seed* pendulous, testa membranous, albumen copious fleshy; embryo minute, far from the hilum, cotyledons diverging, radicle inferior.—Genera 3, species 25, tropical and subtropical (not African).

The above character does not embrace the anomalous genus *Circæaster* which is appended to the Order.

CHLORANTHUS, *Swartz.*

Perennial herbs, or shrubs. *Flowers* in terminal simple or panicled spikes, connate ♂ and ♀ in pairs. *Stamens* 1, or 3 confluent; central anther 2-celled, lateral anthers 1-celled. *Ovary* naked; stigma subsessile, truncate.—Species 8, Eastern Asiatic.

1. **C. officinalis,** *Blume Enum. Pl. Jav.* 79; *Fl. Jav.* iii. 10, t. 1; leaves subsessile elliptic or elliptic-lanceolate acuminate finely gland-serrulate, anthers 3 connate by their connective. *Solms in DC. Prodr.* xvi. 1. 474; *Miq. Fl. Ind. Bat.* i. 1. 804. C. elatior, *Br. in Bot. Mag.* t. 2190. C. erectus, *Sweet*; *Wall. Cat.* 6881. Cryphea erecta, *Ham. in Brewst. Ed. Journ.* 1825, 11, t. 2.

EASTERN HIMALAYA; Sikkim, in hot valleys, *J. D. H.* BHOTAN, *Clarke.* ASSAM, SILHET and the KHASIA MTS., ascending to 4000 ft., *Wallich,* &c., and southward to PENANG, the ANDAMAN ISLANDS, and MALACCA, *Maingay.*—DISTRIB. Yunan, Malay Archipelago, Philippine Islands.

An evergreen erect undershrub, 1–3 ft., quite glabrous and shining. *Leaves* very variable in size and breadth, subsessile, from 3 by 1 in. to 10 by 4 in.; petiole ⅛–¼ in. *Spikes* 1–2 in., in panicles 2–5 in. long; flowers minute, distant. *Berries* ¼ in. diam., white.

2. **C. brachystachyus,** *Blume Fl. Jav. fasc.* viii. 13, 14, t. 2; leaves shortly petioled elliptic or elliptic-lanceolate acuminate coarsely callously serrate, anthers solitary 4-celled. *Solms in DC. Prodr.* xvi. 1. 475; *Miq. Fl. Ind. Bat.* i. 2. 801, and *Ann. Mus. Lugd. Ind. Bat.* iii. 129. C. monander, *Br. in Bot. Mag.* t. 2190 *in note.* C. ceylanicus, *Miq. l. c.* 802. C. denticulatus, *Cord. in Adæus* iii. 296. Ascarina serrata, *Bl. En. Fl. Jav.* i. 79. Sarcandra chloranthoides, *Gardn. in Calc. Journ. Nat. Hist.* viii. 348; *Wight Ic.* t. 1946; *Cord. l. c.* 301.

KHASIA MTS., alt. 4–5000 ft., *Jenkins,* &c.—TRAVANCORE; on the Pulney Mts., *Wight.* PENANG, *Porter, Wallich, Maingay.* CEYLON; Central Province, alt. 3–5000 ft., *Walker,* &c.—DISTRIB. China, Philippine Islands, Japan.

Habit of *C. officinalis,* but taller and more woody, with deeply serrate leaves and red berries.

UNDETERMINABLE AND EXCLUDED SPECIES.

C. GRANDIFOLIUS, *Miq. Fl. Ind. Bat.* i. 1. 802; *Solms in DC. Prodr.* xvi. 1. 477; "branches warted, leaves petioled membranous 7–8 in. long, obversely oblong acuminate remotely callously mucronate-serrate base acute or subcuneate, nerves 8–10 erecto-patent, petiole ½–¾ in., spikes brachiate subopposite or alternate, bract ovate boat-shaped tip subcallous. *Herb. Wight,* n. 878."—I can form no guess as to what this is, having found nothing corresponding to the description in Wight's Herbarium.

C. INCONSPICUUS, *Swartz in Phil. Trans.* lxviii. 359, t. 15; *Solms l. c.* 474. C. indicus, *Wight Ic.* t. 1915.—The specimens of this from which Wight's published drawing was made are in his Herbarium, but without locality, nor is any locality given with his description in the Icones; they are no doubt from China.

ANOMALOUS GENUS.

CIRCÆASTER, *Maxim.*

A small, inconspicuous, very slender annual, with a simple filiform erect stem, bearing at the top a whorled fascicle of leaves and many axillary few-fld. short peduncles. *Leaves* membranous, rhomboidly spathulate, cuneate and quite entire below the middle, above it semicircular and toothed. *Flowers* minute, 2-sexual or female. *Sepals* 2–3, minute, scale-like, persistent. *Petals* 0. *Stamens* 1–2, alternate with the sepals, persistent, filaments linear flattened; anther subglobose, cells rather diverging, opening laterally. *Carpels* 1–4, free, linear-oblong, 1-celled; stigma sessile, oblique; ovule pendulous from the top of the cell. *Ripe carpels* oblong, terete, pericarp membranous, narrowed at the base, sparsely clothed with hooked bristles. *Seed* oblong, testa membranous adherent to the hard fleshy albumen; embryo in the axis of the albumen terete, cotyledons linear, radicle superior.

C. agrestis, *Maxim. in Bull. Acad. St. Pétersb.* xxvii. 556; *Mel. Biol.* xi. 345.

WESTERN HIMALAYA; Kumaon, alt. 8000 ft., *Strachey & Winterbottom, Duthie.* —DISTRIB. W. China.

Stem 3–5 in., ending in fibrous roots. *Leaves* very many in a solitary false whorl, formed of crowded pairs, pale green, narrowed into a broad petiole and together with it 1–1½ in. long, nerves flabellate; immediately below the whorl of leaves are two linear 1-nerved ones, which are the primordial leaves. *Pedicels* shorter than the petioles, very slender. *Sepals* 1/16 in. long, ovate-oblong. *Stamens* twice as long. *Ripe carpels* cylindric, ¼ in long, green, tip acute.—A very obscure plant, of doubtful or indeed unknown affinity, but regarded by Bentham as near *Chloranthaceæ.* It occurs in fields in W. China, and in Kumaon on mossy rocks in woods, &c. The hooked bristles on the carpels are such aids to dispersion that it may be supposed to be common, though so inconspicuous as to be overlooked.

ORDER CXXVI. **MYRISTICEÆ.**

Evergreen trees, often stellately tomentose. *Leaves* alternate, quite entire, exstipulate, often pellucid-punctate. *Flowers* diœcious, small, regular, fascicled umbelled or panicled; bracteoles persistent or caducous. MALE FL. *Perianth* 3-(2–4-)lobed, valvate in bud. *Anthers* 3 or more, connate in a sessile or stipitate column head ring or disk, 2-celled. FEM. FL. *Perianth* of the male. *Staminodes* 0. *Ovary* superior, free, sessile, 1-celled; style short or 0; stigma capitate discoid or lobed; ovule 1, basal, erect, anatropous. *Fruit* fleshy, at length 2- rarely 4-valved. *Seed* erect, enclosed in a thin or fleshy entire or lacerate often highly coloured aril, testa thin or crustaceous, albumen hard densely ruminate; embryo basal, small, cotyledons rounded spreading often wrinkled, radicle short inferior.—Species about 80, Tropical East Asiatic, Malayan and American; a few African, and one Australian.

Previous to the publication of the "Flora Indica" of Dr. Thomson and myself, the British Indian Nutmegs were known only through the named but undescribed specimens distributed by Wallich; for the species contained in Roxburgh's Flora are for the most part from the Archipelago, and were quite undeterminable by that author's brief descriptions. Wallich's types are therefore the foundation of our knowledge; but then there are often several species under one name, and most are in so incomplete a condition, that it is impossible to draw up satisfactory descriptions from them alone, and very difficult to identify other collections by them. Nor is their imperfection the only obstacle; more serious ones are, the excessive variability of the foliage of individual species, throughout the genus, in size, form, texture, pubescence and number of nerves; and the alterations in all these characters in leaves taken at different stages of growth of the same tree. The only other Indian collections available for the "Flora Indica" were Griffith's, and these were assiduously compared with Wallich's in the endeavour to unravel the intricacies of the genus and limit its species. The arrival of Maingay's splendid Malay Peninsular Herbarium, and his notes on this genus, have enabled me in the present work to correct several erroneous determinations of the "Flora Indica," and to approach nearer to a satisfactory description of the species; but much still remains to be done, which can only be accomplished by a study of living specimens at different times of the year. For every species, flowers of both sexes and ripe fruit are all absolutely necessary for its exact limitation, and the knowledge of its affinities, as well as for establishing sections of the genus. Hitherto for the latter purpose most importance has been given to the structure of the staminal column, which from its minuteness (in most of the species) is difficult of analysis, in dried specimens especially; and I am inclined to think that this organ is more variable than has been supposed, and that some sections founded on it by Alph. De Candolle and others must be abandoned. In the following descriptions, that of the colour of the foliage applies only to dried specimens. This genus affords a fine field for study, but to do this effectually requires a careful comparison of the materials in the Herbaria of Holland, Florence, and Kew. Until this is done, it will be impossible to say which of many of the Indian species are natives of the Malay Archipelago.

MYRISTICA, *Linn.*

Character of the Order.

Sect. I. **Eumyristica.** *Male flowers* racemed or panicled; perianth with a persistent scale-like bracteole at its base. *Anthers* elongate, firmly connate in a shortly stipitate or sessile column.

M. fragrans, *Houtt. Hist. Nat.* ii. 3. 233; glabrous, leaves 3-3½ in. elliptic-oblong or -lanceolate acuminate, glaucous beneath, nerves about 8 pair slender, flowers bracteolate males in lax slender supra-axillary racemes. *Alph. DC. in Prodr.* xiv. 1. 189; *Blume Rumph.* 180, t. 55; *Miquel Fl. Ind. Bat.* i. 2. 53; *Bentl. & Trim Med. Pl.* iii. t. 218. M. officinalis, *Linn. f. Suppl.* 265; *Gærtn. Fruct.* i. 194, t. 41 (*excl. syn. Rumph.*); *Hook Exot. Bot.* t. 155, 156, and *Bot. Mag.* t. 2756, 2757; *Spach Suites Buff.* t. 143. M. moschata, *Thunb.*; *Wall. Cat.* 6785; *Roxb. Fl. Ind.* iii. 843; *Reichb. Ic. Exot.* t. 276, 277; *Woodv. Med. Bot.* iv. t. 238; *Hayne Arnz. Gewachs.* ix. t. 12; *Nees Pl. Med.* t. 133; *Guimp. & Schl.* t. 73, 74. M. aromatica, *Lamk. in Act. Par.* 1788, 155, t. 5-7, and *Ill. Gen.* t. 832; *Roxb. Cor. Pl.* iii. 267.—*Rumph. Herb. Amb.* ii. 14, t. 4.

Cultivated in the Malayan Peninsula, Penang and the Malay Islands;—native of the Eastern Moluccas.

A lofty tree; branches slender. *Leaves*. coriaceous, sometimes oblanceolate, and tip caudate, base acute, pale yellow brown, paler with red-brown nerves beneath; petiole ¼-½ in. *Male racemes* 1-2 in.; flowers ¼ in. long, ellipsoid or urceolate, nodding; bracteole a scale under the glabrate perianth; anthers 9-12, connate in a cylindric stipitate column. *Fruit* ovoid, subglobose or pyriform, 1½-2 in. long.—*Alph. DC.* describes the perianth as strigose with appressed hairs, but I find them to be nearly or quite glabrous; Blume says very sparsely strigose.

1. **M. elliptica,** *Wall. Cat.* 6798 A; glabrous, leaves 8-10 in. linear-oblong subacute subglaucous beneath, nerves about 12 pair slender, male fl. in short axillary racemes bracteolate urceolate, fem. fl. few fascicled on short supra-axillary peduncles. *H. f. & T. Fl. Ind.* 162; *Alph. DC. in Prodr.* xiv. 1. 190; ? *Kurz For. Fl.* ii, 282.

Penang and Singapore, *Wallich.* Malacca, *Maingay* (*Kew Distrib.* 1296). ? Andaman Islands, *Kurz.*

A tree; branches stout. *Leaves* very pale; petiole ½-1 in., stout. *Male perianth* elongate-urceolate or ellipsoid, ¼ in. long, 3-toothed; bracteole orbicular; connective apiculate; *fem.* urceolate; ovary stipitate strigose, stigma oblong. *Fruit* 2½ in. long, oblong, glabrous; "aril blood-red laciniate," *Maingay.*—I have seen no Andaman specimens, and Kurz's description is quite at variance with Wallich's plant in the scurfy tomentose inflorescence (see *M. andamanica*). Wallich's "6798 B ? fructu maximo" is doubtful.

2. **P. laurifolia,** *Hook. f. & T. Fl. Ind.* 163; glabrous except the inflorescence, leaves 6–9 in. shortly petioled very coriaceous linear-oblong or -lanceolate obtuse or subacute glaucous beneath, nerves 12–20 pair, male fl. bracteolate tomentose densely crowded in a very short stout axillary peduncle. *Alph. DC. in Prodr.* xiv. 1. 191; ? *Beddome Fl. Sylv.* t. 267. M. diospyrifolia, *Alph. DC. l. c.* M. tomontosa, *Thwaites, fid. Alph. DC. l. c.*

Deccan Peninsula; on the Western Ghats from Canara to Cape Comorin, from the plains up to 5000 ft., *Beddome*, &c.. Ceylon, Central Province, alt. 1500–4000 ft., *Walker*, &c.

Branches moderately stout. *Leaves* variable, shining above with impressed nerves, pale brown or whitish beneath, base acute rounded or cuneate; nerves sometimes very faint; petiole 1–1½. *Peduncle* very stout indeed, ⅛ in. long or less; flowers densely crowded, sessile or stoutly pedicelled, nearly ¼ in. long, silkily pubescent, shortly 3-lobed.—Beddome's figure represents a much more slender plant than any of the specimens I have seen, with slender petioles and pedicels, the latter loosely clustered on an almost obsolete peduncle. *Fruit* in Beddome's figure 2½ in. diam., globose, apiculate, with a deep longitudinal furrow; aril deeply cut into linear lacerate lobes, nearly enclosing the seed.—Alph. De Candolle gives *M. tomentosa*, Thwaites (not H. & T.), as a synonym of *M. diospyrifolia*, but I do not find that name of Thwaites, and as the plant is glabrous, I suspect some error of citation.

Var. *lanceolata;* leaves lanceolate 6 by 1½ in., petiole very stout, nerves very faint. —S. India, *Beddome*.

Var. *zeylanica;* leaves linear-oblong obtuse 7–8 by 2–2½ in., petiole more slender, pedicels longer. M. ceylanica, *Alph. DC. in Ann. Sc. Nat. Ser.* 4, iv. 29, and in *Prodr.* xiv. 1. 190. M. zeylanica, *Thwaites Enum.* 11 and 399.—Ceylon, *Thwaites.*—Beddome's figure more resembles this than it does the other Ceylon form of the species, which is identical with the peninsular Indian.

3. **M. andamanica,** *Hook. f.*; glabrous, leaves petioled membranous elliptic-oblong subacute not glaucous beneath, nerves 12–15 pair very slender, male flowers in sessile or peduncled clusters on the branches very shortly pedicelled, bracteole large, perianth globose 3-lobed, staminal column oblong obtuse. ? M. elliptica, *Kurz For. Fl.* ii. 282 (*not of Wall.*).

Andaman Islands; *Herb. Hort. Bot. Calcutta.*

Branches slender, quite glabrous, youngest shoots rustily hoary. *Leaves* almost membranous, 3–4 in. diam., pale brown when dry on both surfaces, base acute, nerves spreading; petiole ¾–1¼ in., slender. *Clusters of flowers* sessile or on a thick 3–6 fld. peduncle ¼–½ in. long; pedicel ⅛ in., stout, rather scurfy; perianth quite glabrous and smooth, ⅛–⅙ in. diam.—Apparently a very distinct species, but approaches *M. malabarica.*

4. **M. malabarica,** *Lamk. in Act. Par.* 1788, 162; nearly glabrous, flowering branches slender, leaves 4–8 by 1½–4 in. linear-oblong or elliptic-lanceolate subacute glaucous beneath, nerves 8–14 pair, male fl. in subcymose panicles bracteolate, peduncles and pedicels slender, perianth globose, anthers 10–15, fruit narrowly oblong pubescent. *Blume Rumph.* i. 185; *Hook. f. & T. Fl. Ind.* 163; *Alph. DC. in Prodr.* xiv. 1. 195; *Dalz. & Gibs. Bomb. Fl.* 4; *Beddome Fl. Sylv.* t. 269. ? M. tomentosa, *Grah. Cat. Bomb. Pl.* (*not H. f. & T.*). M. dactyloides, *Wall. Cat.* 6786 (*hardly of Gærtner*). M. notha, *Wall. Cat.* 6787.—*Rheede Hort. Mal.* iv. t. 5.

The CONCAN, CANARA and N. MALABAR, *Heyne*, &c.

A tall tree. *Leaves* thinly coriaceous on the flowering branches, thick and leathery on the fruiting, more or less shining above, nerves very slender; petiole ¾–1 in. *Male panicles* 1–1½ in., axillary and supra-axillary; peduncle naked below, subumbellately cymose above; bracteole a, orbicular scale; perianth ⅛ in., puberulous, 3-toothed; anthers connate in a cylindric shortly stipitate column. *Female panicles* few-fld.; flowers larger. *Fruit* 2 by 1 in., pubescent.—A fruiting specimen apparently of this species from Dalzell (marked *amygdalina*?) has oblong leaves 10 by 4 in. and rounded at the base; the detached fruit accompanying it is, however, long and pubescent as in Rheede's and Beddome's figures of *malabarica*. On the other hand, fruits that accompany Wight's Malabar specimens of *malabarica* are shorter broader and only 1¼ in. long.

5. **M. malaccensis,** *Hook. f.*; quite glabrous, branches rather slender, leaves 8–10 in. linear-oblong acute or acuminate, nerves 15–20 pair slender, male fl. in subcymose fascicles bracteolate subglobose, anthers about 7.

MALACCA, *Maingay* (*Kew Distrib.* 1305).

Habit of *M. malabarica*, but leaves longer, usually rounded at the base but sometimes acute, petiole rather short ⅛–¼ in., panicle longer 3–4 in., with more numerous much smaller flowers $\frac{1}{10}$ in. long, on slender rather longer pedicels. *Perianth* 3-toothed; anthers connate in a broad sessile column, tips acute.—The probable fruiting state of this, according to Dr. Maingay's Herbarium notes (Kew Distrib. 1304) in specimens of which the leaves 6 in. long are elliptic-oblong obtuse very leathery acute at the base with a very stout petiole, "Fruit subglobose 1¼ by 1⅛ in., glabrous, pale-yellowish; pericarp thick, fleshy, $\frac{2}{10}$–$\frac{3}{10}$ in. thick; aril complete, slightly lobed at the tip, clear reddish orange, testa slightly crustaceous pale brown."

6. **M. magnifica,** *Beddome Fl. Sylv.* t. 268; young parts clothed with golden pubescence, leaves 10–24 in. thickly coriaceous linear-oblong acute or acuminate densely stellately tomentose beneath glabrate in age, nerves 20–26 pairs, male flowers tomentose dense crowded on very short stout axillary peduncles bracteolate, fruit large oblong.

SOUTH TRAVANCORE; in the plains, *Beddome*.

An immense gregarious tree, 100 feet high, described by Beddome as having buttressed trunks, most like *M. laurifolia*, but different looking, with different pubescence venation and antheriferous column, and a larger fruit. Except in the much larger size and pubescence, I see no difference between this and *laurifolia*. The specimen communicated by Beddome, and which he says was pronounced at Kew to be *M. malabarica*, consists of a single leaf 20 by 6 in., with 20 pairs of nerves, and a very stout petiole and midrib; it is perfectly glabrous, presents no definite character but size and corresponding number of nerves; both the texture, colour and nervation occur in leaves of *M. laurifolia* and *malabarica*.

7. **M. Maingayi,** *Hook. f.*; branches stout black, shoots and inflorescence rusty-tomentose, leaves 7–10 in. linear-oblong acute or acuminate glabrous, nerves 14–18 pairs, male panicles axillary and supra-axillary, peduncle and pedicels short very stout, perianth bracteolate ovoid, column of anthers slender acute.

MALACCA, *Maingay* (*Kew Distrib.* 1289).

A lofty tree. *Branches* much angled by the contraction of the bark in longitudinal ridges. *Leaves* very coriaceous, 2–2½ in. broad, pale brown, nerves slender, base acute or rounded; petiole 1 in. *Male panicles* decurved, 8–10-fld.; peduncle compressed; pedicels about ¼ in.; perianth as long, broadly ovoid; bracts caducous; bracteole broad half as long as the perianth; anthers 9, stipes very short, pubescent.—Approaches *M. hyposticta*, Miquel, of Java, but the stout branches with black bark and very coriaceous leaves not glaucous beneath appear to distinguish it.

Sect. II. **Pyrrhosa,** *Blume* (Irya, *H. f. & T.*, Horsfieldia & Gymnacranthera, *Alph. DC.*). *Male flowers* ebracteolate (bracteoles fugacious) generally minute, in many-fld. compound panicles (or paniculate heads in *M. Horsfieldii*). *Anthers* combined in a fleshy oblong turbinate spherical or 3-gonous sessile (rarely stipitate) column or cup.

* Anthers produced to the base of the column, closely combined throughout their length (not separable), *or the tips alone free.*

† *Panicles more or less tomentose.*

8. **M. superba,** *Hook. f. & Thoms. Fl. Ind.* 162; branchlets leaves beneath and panicles scurfily rusty-tomentose, leaves 12–18 in. elliptic-lanceolate or oblanceolate, nerves 25–30 pair, male panicles robust, perianth glabrous, staminal column subsessile solid ovoid obtuse, anthers 10. *Alph. DC. in Prodr.* xiv. 1. 194.

PENANG, *Phillips.*

Branches stout. *Leaves* coriaceous, 4–8 in. broad, bright red brown, and loosely stellately-tomentose beneath; nerves firm, nearly straight; petiole ¾ in. *Male panicles* in the axils of fallen leaves, 4–6 in. long; perianth ⅛ in. long, ellipsoid, obtuse, 3–4-toothed; pedicel as long, very stout; anthers closely confluent to their tips in a subsessile column not apiculate. *Female fl.* and *fruit* unknown.

9. **M. Murtoni,** *Hook. f.*; branchlets young leaves beneath and panicles rustily tomentose, leaves 10–12 in. oblong very coriaceous glaucous beneath, base rounded or cordate, nerves 20–30 pair slender spreading, male fl. ⅙ in. long broadly ovoid in short stout dense-fld. panicles very shortly pedicelled, staminal column fusiform sessile, anthers with the tips free.

SINGAPORE, *H. J. Murton.*

Branches very stout. *Leaves* 3–5 in. broad, brown and shining above, old quite glabrous beneath; petiole ½–¾ in., very stout, glabrous. *Male panicles* 1–2 in. long; flowers densely crowded, perianth lobed ⅓-way down; anthers slightly twisted. *Fem. fl.* and *fruit* unknown.—This appears to be nearest to *M. superba*, differing in the much smaller flowers and fewer anthers with free tips.

10. **M. tomentosa,** *Hook. f. & Thoms. Fl. Ind.* 161; branchlets leaves beneath and panicles softly rusty-tomentose, leaves 5–12 in. elliptic-oblong lanceolate or oblanceolate at length glabrate, nerves 12–20 pair, male panicles robust, perianth $\frac{1}{12}$ in. diam. globose glabrous granulate, staminal column sessile turbinate solid top depressed. *Alph. DC. in Prodr.* xiv. 1. 204.—Myristicacea, *Wall. Cat.* 9025.

PENANG, *Porter, Phillips.* MALACCA, *Maingay* (*M. Wallichii, Kew Distrib.* 1284).—DISTRIB. Borneo?.

Branches stout, bark grey. *Leaves* 2–2½ in. broad, thinly coriaceous, dull brown above, bright red-brown beneath; base acute or cuneate; petiole ½ in. *Male panicles* like those of *M. Wallichii*, but not so long and stout; pedicels slender; perianth 3–4-cleft, glabrous; anthers about 15, quite confluent; tips incurved but not free.—A Bornean plant entirely resembles this, except in that it has a much smaller staminal column, with only about 10 anthers. I greatly doubt the constancy of the characters drawn from the number of anthers in this genus.

11. **M. Wallichii,** *Hook. f. & Thoms. Fl. Ind.* 161; shoots ashy grey, leaves 8–12 in. oblong or linear-oblong acute or acuminate glabro
or sparingly rusty-tomentose beneath, nerves 20–25 pair, male p sta-
very stout rusty-pubescent, perianth $\frac{1}{10}$ in. diam. subsessile gl incurved
minal column a depressed 3-gonous 3-lobed fleshy sessile cup

anther-cells. *Alph. DC. Prodr.* xiv. 1. 203. M. Horsfieldii, *Blume?* *Wall Cat.* 6806, *in part.*

MALACCA, *Maingay* (*Kew Distrib.* 1284). SINGAPORE, *Wallich, Lobb, Maingay* (*M. crassifolia*, Kew Distrib. 1283).

A tall tree, branches robust. *Leaves* 2–3½ in. broad, very coriaceous, dull brown above, red brown beneath, nerves spreading; petiole 1–1½ in., often stout. *Male panicles* axillary and from the axils of fallen leaves, branched from the base which is often as thick as the petiole, branches stout; flowers pedicelled, thickly coriaceous, in globose clusters of 8–10, 3–4-5cleft; anthers 10–12 (24–27 cells ?, *Maingay*), forming a low obconic 3-gonous fleshy column of firmly united cells. *Female panicles* short; fruit (unripe) very shortly and stoutly pedicelled.—This species, which is probably a variety of *M. tomentosa*, was founded on the young fruit and leaves of one of a mixed lot of species comprised under Wallich's No. 6806, of which he says "forsan duæ species mixtæ." There are two sheets of specimens under this number; one contains the fruiting specimens taken up as *Wallichii*, together with a panicle of male fl. of *M. crassifolia*; the other contains scraps of *M. polyspherula* and *M. crassifolia.*

12. **M. Kingii,** *Hook. f.*; leaves 8–10 in. long-petioled obovate or oblanceolate obtusely acuminate thinly coriaceous quite glabrous not glaucous beneath, nerves 15–20 pair very slender, panicles 4–6 in. sparsely rusty-tomentose flowers pedicelled, male perianth globose ⅛ in. diam. 3–4 cleft, staminal column sessile depressed-globose top concave, anthers firmly united with incurved tips.

SIKKIM HIMALAYA; near Sivoke, alt. 10,000 ft., *King.* ? ASSAM, *Masters in Herb. Calcutt.*

Branches very stout with rough bark and large scars of fallen leaves. *Leaves* 3½–5 in. broad, pale brown on both surfaces when dry, nerves spreading; petiole 1–1½ in. *Panicles* rather stout, from the axils of fallen leaves, much and loosely branched, flowers not very crowded; pedicels short stout. *Perianth* thick. *Staminal column* small; anthers about 20 ?.—This differs from *M. glabra*, to which it is perhaps too closely allied, in the pubescent panicle, longer petiole, larger leaves with more numerous veins and stouter panicles and pedicels, larger perianth and small depressed staminal column. The Assam specimens are of leaves only, 12–18 in. long by 5–7 broad.

13. **M. Horsfieldii,** *Blume Bijd.* 577, and *Rumph.* i. 192; leaves very coriaceous 8–12 in. oblong or elliptic-oblong rusty-tomentose beneath at length glabrate, nerves 16–30 pair very strong, male panicles rusty-tomentose, flowers sessile in dense globose heads, perianth 1/20 in. long clavate angled 3–4-toothed, anthers 6 confluent in a clavate sessile column depressed at the top. *Hook. f. & T. Fl. Ind.* 164; *Alph. DC. in Prodr.* xiv. 1. 200; *Bedd. For. Man.* 176. M. Iryadghedhi, *Gærtn. Fruct.* i. 196, t. 41, f. 4, *excl. syn.* M. ferruginea, *Wall. Cat.* 6803. Pyrrhosa Horsfieldii, *Wight Ic.* t. 1857. Horsfieldia odorata, *Willd. Sp. Pl.* iv. 872.

CEYLON; in the Ambagamowa and Ratnapoora districts. SINGAPORE (*cult.* ?), *Wallich.*—DISTRIB. Cult. in Java.

A tall tree, branches very stout, densely woolly, at length glabrate. *Leaves* 2½–4 in. diam., pale bright-brown above, rufous at first beneath, or red brown; petiole very stout, ½–1 in. *Male panicles* 3–6 in., rachis and branches very stout; heads of flowers ¼–½ in. diam., quite globose; perianths subsessile, compacted, glabrous, hardly pedicelled; bracteoles orbicular, retained amongst the flowers but caducous, densely woolly outside; anthers quite confluent to the tips. *Female panicles* short, few-fld., ovary tomentose. *Fruit* shortly stoutly peduncled, ovoid, 1 in. long, rusty-tomentose; aril fleshy, entire.

** *Panicles glabrous.*

14. **M. amygdalina,** *Wall. Pl. As. Rar.* i. 79, t. 90, and *Cat.* 6797;

glabrous, leaves 6–8 in. elliptic-lanceolate acute at both ends, nerves 8–12 pair, male panicles much branched, perianths 1/10 in. diam. globose 2–3-fid; staminal column cupular subglobose, anthers firmly united, fruit ellipsoid, aril nearly entire yellow. *Hook. f. & Thoms. Fl. Ind.* 160; *Alph. DC. in Prodr.* xiv. 1. 203; ? *Kurz For. Fl.* ii. 283. M. exaltata, *Wall. Cat* 6804 B ?.

TENASSERIM; at Tavoy and Moulmein, *Wallich.*

A tall perfectly glabrous tree. *Leaves* 1½–2 in. diam., coriaceous, pale brown on both surfaces, narrowed into a petiole ½ in. long. *Male panicles*, from the axils of fallen leaves, 3–5 in. long and nearly as broad, branched from the base, quite glabrous; flowers loosely clustered, pedicels as long as the perianth, slender; staminal column globosely trigonous, fleshy, concave; anthers about 8, wholly combined. *Fruit* shortly peduncled, 1½ in. long; pericarp rather thin, glabrous; aril yellow, lacerate at the tip only.—This species again was founded on fruiting specimens of Wallich's, but I think there is no doubt that his *M. exaltata*, B ?, from the same country is the same in male flowering state. In the "Flora Indica" there are united with it two very similar Malaccan plants, which have, however, quite different stamens (one is *M. polyspherula*, the other perhaps the same). I am in doubt as to Kurz's *M. amygdalina*; his description agrees with that here described except in that the leaves have 12–19 pairs of nerves and the panicles are supra-axillary. A plant of Helfer's differs only in having more anthers and rather larger flowers, tending to unite the following with this.

15. **M. glabra,** *Blume Bijd.* 575, and *Rumphia* i. 191, t. 64, fig. 1; quite glabrous, leaves 3–8 in. elliptic-lanceolate or oblong obtuse acute or acuminate, base acute, nerves 7–14 pair, male panicle much branched, perianths ⅐–1/10 in. diam. ovoidly globose 2–4-cleft glabrous, staminal column oblong or turbinate, anthers firmly united tips incurved or inflexed, fruit oblong or ellipsoid, aril thin scarlet. *Hook. f. & Thoms. Fl. Ind.* 161; *Alph. DC. in Prodr.* xiv. 1. 202. M. integra and M. floribunda, *Wall. Cat.* 6799, 6803.

SILHET, *Wallich, J. D. H. & T. T.* ? TENASSERIM, *Helfer* (*Kew Distrib.* 4358). SINGAPORE, *Wallich, Murton.* MALACCA, *Maingay* (*Kew Distrib.* 1286).—DISTRIB. Java.

Leaves coriaceous, not glaucous beneath, rather pale brown, very variable in size and apex, but base always acute and petiole short, hardly exceeding ½ in. *Male panicles* 2–6 in., quite glabrous, branched from the base; peduncles and pedicels slender. *Staminal column* variable in length, top rounded; anthers 12–15, the tips meeting in a concavity or not. *Fruit* broadly oblong or ellipsoid, 1 in. long, deeply grooved on one side towards the base; valves thick. I doubt this being different from *M. amygdalina.* Helfer's specimens have much smaller flowers than the Silhet ones, and more numerous anthers.

16. **M. bivalvis,** *Hook. f.*; quite glabrous, leaves 7–10 in. linear-oblong obtusely acuminate, nerves 15–20 pair, male panicles much branched, perianths ⅙ in. diam. broader than long transversely 2-valved, staminal column a laterally compressed 2-fid fleshy cup clothed with numerous and deeply inflexed anthers.

SINGAPORE; in jungles behind the Botanical Gardens, *Murton.*

A bushy tree, 30–40 ft. high, bark grey. *Leaves* 2–2¼ in. diam., darker brown above, pale not glaucous beneath; nerves very spreading; petiole ⅙–⅓ in. *Male panicles* quite glabrous; perianths the largest of the group, turgid, transversely oblong; pedicel as long as the valves; anther column an obconic compressed sessile fleshy cup, or rather a cup formed of the firmly united anther-cells, which from incurved as two inflexed opposite flaps, tips of the cells not free.—A [illegible] Roxburgh's Herbarium resembles this closely, but the leaves are more with more oblique nerves, and the inflexed anthers are confined to the upper part of an obconic stipes, as in *Irya.* It is probably one of the species described by Roxburgh in terms too brief to be of any use in identifying the plants intended.

** Anthers produced to the base of the column or not, cells more or less free, easily separable.

17. **M. Farquhariana,** *Wall. Cat.* 6795; glabrous except the panicle, leaves 5–10 in. oblong or linear- or elliptic-oblong acute or acuminate usually very glaucous beneath, nerves 8–20 pair, male panicles spreading, perianth bell-shaped 3-fid pubescent within, staminal column sessile, anthers free above, tips erect acute. *Hook. f. & Thoms. Fl. Ind.* 162; *Alph. DC. in Prodr.* xiv. 1. 200; *Beddome Fl. Sylv.* t. 270. M. paniculata, *Alph. DC. in Ann. Sc. Nat. Ser.* 4, iv. 31, and in *Prodr. l. c.*

DECCAN PENINSULA; from the Concan to Wynaad and Tinnevelly, ascending the Ghats to 2000 ft. MALACCA, PENANG and SINGAPORE, *Wallich,* &c., *Griffith* (*Kew Distrib.* 4355), *Maingay* (*Kew Distrib.* 1290, 1293, ?1302).—DISTRIB. Philippine Islands.

A tall tree, young parts pubescent; branches stout, grey. *Leaves* extremely variable in size, form and texture, nerves faint or strong; petiole ½–¾ in. *Male panicles* 3–8 in., rather slender, branched from the base; flowers fascicled, perianth ¼ in.; anthers 7–11, narrow, connectives attached behind and from the base to about the middle only, so that the anthers are easily detached by dissection. *Female panicles* 6–10-fld. *Fruit* 1–1¼ in., subglobose, glabrous, aril lacerate.—This species is founded on Wallich's Singapore fruiting specimen; the identity in foliage of those and a Malaccan plant of Griffith with small flowers suggested their union in the "Flora Indica." As stated under *M. Griffithii,* there are specimens of that plant as like Wallich's type in foliage. In the "Flora Indica" the anthers are described as having involute tips, but this is not the case. Alph. DC. separates the Malayan specimens from the Deccan ones on characters taken from the foliage, but the leaves vary greatly in both countries, and identical forms are common to both.

18. **M. crassifolia,** *Hook. f. & Thoms. Fl. Ind.* 160; nearly glabrous, leaves 8–12 in. thickly coriaceous oblong obtuse or acute, base rounded or cuneate, nerves 12–15 pair, male panicle sparsely rusty-pubescent, perianth $\frac{1}{30}$ in. glabrous usually 2-fid, anthers 3–5 in a depressed ring, cells separable. *Alph. DC. in Prodr.* xiv. 1. 204. M. Horsfieldia, *Blume ?, Wall. Cat.* 6806, *in part.* M. Irya, *var.* crassifolia, *Miquel in Herb.*

MALACCA, *Griffith* (*Kew Distrib.* 4550). SINGAPORE, *Wallich, Anderson.*—DISTRIB. Borneo.

Branches very robust. *Leaves* 3–4½ in. diam., grey-brown above, red-brown beneath, nerves slender; petiole ¾–1 in., very stout. *Male panicle* 3–4 in., branche from near the base; flowers clustered, globose; anther-cells 6–10, slightly coherin by their backs, sessile, tips free, hardly incurved.

19. **M. polyspherula,** *Hook. f.*; glabrous except the panicle, leave 6–10 in. linear-oblong or lanceolate obtuse acute or acuminate, nerves 8–1 pair base rounded or acute, male panicle rusty-tomentose, perianth globos $\frac{1}{20}$ in. diam. glabrous 2–4-cleft, anthers 4–6 in a depressed column, cell separable. M. globularia, *Hook. f. & Thoms. Fl. Ind.* 160; *Alph. DC. i Prodr.* xiv. 1. 202 (*not of Blume*). M. Horsfieldia, *Blume ?, Wall. Cat* 6806, *in part.*

SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 4351 *amygdalina,* an *globularia*); *Maingay* (*Kew Distrib.* 2286, *glabra*).

Branches stout, shoots slightly scurfy, bark grey. *Leaves* rarely 2 in. broad coriaceous, greenish grey above, brown beneath; nerves slender, nearly horizontal; petiole ⅓–½ in., stout. *Male panicles* 3–3½ in., branching from near the base, flowers pedicelled, glabrous, yellow, black when dry; anthers in a sessile broadly obconic trigonous truncate mass, anther-cells incurved and meeting in a tricrural line.—Specimens of *M. globularia* from Amboyna show that this was erroneously referred to that plant in "Flora Indica." From *M. amygdalina*, with which it was confounded in "Flora Indica," the stamens at once distinguish it.

20. **M. Griffithii,** *Hook. f.*; glabrous except the finely pubescent panicles and flowers, leaves 5–6 in. linear-lanceolate finely acuminate shining above glaucous beneath, base acute, nerves 8–10 pair, very faint, male panicles slender, perianth globose $\frac{1}{30}$ in. diam. 2–3-cleft, anthers 8 in a globose sessile mass, cells separable.

MALACCA, *Griffith* (*Kew Distrib.* 4356). SINGAPORE, *Maingay* (*Kew Distrib.* 1306).

Leaves 1½–1¾ in. broad, very coriaceous (smaller in Maingay's specimens), and 2½–3 by 1–1¼ in., pale brown above, very glaucous beneath with a reddish midrib; petiole ½ in. *Male panicle* narrow, rachis and distant branches very slender, naked below; flowers clustered, pedicel slender; anthers easily separable, curved, attached by the back with free tips and sides; cells confluent. Fruit "racemed, size of a cherry, pedicel ½ in., pericarp thick with a deep longitudinal furrow; aril white, as long as the seed," *Griffith mss.*—In Maingay's specimens fruit "elliptic or subglobose ¾ in. long dirty orange minutely scurfy, aril complete pinkish convolute lacerate at the tip," *Maingay mss.* I cannot be certain of Maingay's and Griffith's plants being conspecific; their foliage is identical, but this is all undistinguishable from states of *M. Farquhariana.*

21. **M. Irya,** *Gærtn. Fruct.* i. 195, t. 41; leaves 6–10 in. linear- or elliptic-oblong acuminate glabrous, nerves 12–20 pair slender, perianth globose $\frac{1}{20}$ in. diam. glabrous 2–3-cleft, anthers 6–8 free in a ring crowning an obconic receptacle, fruit panicled globose. *Hook. f. & T. Fl. Ind.* 159; *Alph. DC. in Prodr.* xiv. 1. 202; *Miquel Fl. Ind. Bat.* i. 2. 64; *Beddome Forest. Man.* 176. M. javanica, *Blume Bijd.* 576, and *Rumph.* i. 190, t. 62. M. sphærocarpa, *Wall. Pl. As. Rar.* i. 79, t. 89, and *Cat.* 6796. M. exaltata, *Wall. Cat.* 6804, *in part.*

TENASSERIM, *Wallich.* SOUTH ANDAMAN ISLANDS, *Kurz.* MALACCA, *Griffith* (*Kew Distrib.* 4357), *Maingay* (*Kew Distrib.* 1291, 1292). CEYLON, not uncommon. —DISTRIB. Sumatra, Java, Borneo.

A tree, buds ashy. *Leaves* 2–3 in. broad, membranous at length coriaceous, dark brown above, lighter beneath, base rounded cuneate or acute; petiole ½ in. *Male panicles* 3–6 in., very many-fld.; fem. shorter, perianths larger. *Fruit* 1 in. diam., glabrous; pericarp coriaceous; aril thin, entire, yellow or reddish, seed globose.—With the habit inflorescence and minute flowers of Sect. *Pyrrhosa*, this has nearly the staminal column of a *Knema.*

Sect. III. **Knema.** *Male flowers* fascicled on the top of a short stout peduncle or tubercle; pedicels with a persistent bracteole about the middle (under the flower in *M. Cantleyana*). *Anthers* short, in a whorl round a peltate disk.

22. **M. Hookeriana,** *Wall. Cat.* 6802 A; branchlets very stout leaves beneath and panicle most densely flocculent and woolly, leaves 1–2 ft. at length glabrate and glaucous beneath linear-oblong or narrowed downwards obtuse or acute, petiole short thick, nerves 20–30 pair, male fl. ⅓ in. diam. densely clustered on a short peduncle or tubercle 3-cleft, anthers about 20 on the margin of a long-stipitate orbicular peltate disk, *Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. in Prodr.* xiv. 1. 204. ur-

PENANG, *Wallich, Porter.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1279).

Branches as thick as the fore-finger; wool tawny, ¼ in. thick, flocculent. *Leaves* very variable in breadth, narrowest 12 by 2½ in., broadest 24 by 8 in., thickly coriaceous, pale brown and shining above, wool on under-surface deciduous in large flakes leaving the surface perfectly glabrous. *Male fl.* "crimson within," *Maingay*; pedicels ½–1 in. long, with a persistent bracteole about the middle; stamens pale rose, filaments very short, anthers deflexed; fem. fl. not seen. *Ovary* "rusty tomentose; stigma subsessile, disciform, concave, crenate-serrate," *Maingay. Fruit* 2½ in. long, ellipsoid, most densely woolly, perianth very thick; aril fleshy, lobed.—Wallich's 6802 B, without flower or fruit, is probably Laurineous.

23. **M. Cantleyi,** *Hook. f.*; branchlets robust and petioles and young leaves and inflorescence densely rusty-tomentose, leaves 9–12 in. oblong or linear-oblong coriaceous glaucous beneath, nerves 20–30 pair strong, male fl. clustered on a tubercle shortly stoutly pedicelled, perianth bracteolate at the base 3-fid, anthers 6–8 on the margin of a stoutly clavately stipitate small disk.

SINGAPORE, N. *Cantley.*

Branches stout with pale bark. *Leaves* 3–5 in. diam., dark brown above, young clothed with flocculent rusty fugacious wool which is more persistent on the midrib above, beneath finely pubescent (probably glabrate in age); petiole very short, stout. *Male fl.* ⅙–¼ in. diam., with the pedicels ¼–⅓ in. long; bracteole orbicular, appressed to the perianth; perianth-lobes short; staminal column small, anthers short sessile separate. *Fem. fl.* and *fruit* unknown.—This appears to be most nearly allied to *M. Hookeriana*; it differs from the other Indian species of this section in the bracteole being close under the perianth.

24. **M. longifolia,** *Wall. Cat.* 6801; branches scurfy or glabrous, leaves 1–2 ft. linear or linear-oblong or obovate-oblong obtuse glabrous glaucous beneath base rounded cordate or acute, nerves 20–40 pair stout, male fl. clavate ¼ in. diam. fascicled on a tubercle pedicelled 3-cleft, anthers 12–18 on the teeth of a long-stipitate circular disk, style long glabrous, stigma small toothed. M. longifolia, *in part, Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. Prodr.* xiv. 1. 204; *Kurz For. Fl.* ii. 283. ? M. linifolia, *Roxb. Fl. Ind.* iii. 847.

SIKKIM HIMALAYA, in hot valleys, *Thomson.* ASSAM, SILHET and the KHASIA MTS., *Wallich*, &c. CHITTAGONG, *J. D. H. & T. T.* PEGU, MATABAN and TENASSERIM, *Kurz.*—DISTRIB. Ava.

A lofty tree, branchlets stout or slender, sometimes tomentose. *Leaves* extremely variable, usually linear, 12–18 by 2–2½ in., sometimes much broader, 18–24 by 6-7 in. and narrowed below the middle, thickly coriaceous, pale yellow-brown and shining above, nerves arched or nearly horizontal; petiole ½–1 in., stout, glabrous or tomentose. *Male fl.* very variable in size, ⅕–⅓ in. diam., densely tomentose, scarlet within; pedicel ⅙–⅔ in., bracteole obscure; anther-disk concave or plane; pedicel grooved, contained in the tubular base of the perianth; anthers short, deflexed. *Female* pedicels very short; ovary densely tomentose. *Fruit* 1–2 in. long, subglobose or ellipsoid, tomentose; aril pale, thin, lobed above the middle.—The Malayan plant referred to under this species in "Flora Indica" is *M. furfuracea.*

VAR. *erratica*; leaves smaller 6–10 by 1½–2½ in. M. erratica, *Hook. f. & Thoms. Fl. Ind.* 156; *Alph. DC. in Prodr.* xiv. 1. 205. M. corticosa, *Hook. f. & Thoms. l. c.* 156, *in part.*—Khasia Mts. and Chittagong.—I fear this is only a small-leaved state of *M. longifolia*, and not even a variety; the stigma is identical, and the character taken from the top of the antheriferous disk being flat (in opposition to concave in *longifolia*), cannot be relied on. The flowers are, however, much more trigonously globose, and the stalk of the anther-disk is shorter.

25. **M. attenuata,** *Wall. Cat.* 6791; branchlets and inflorescence raceously tomentose, leaves 5–9 in. elliptic-oblong or -lanceolate acute

or acuminate glaucous beneath, nerves 14–20 pair, male fl. fascicled on a short peduncle, pedicels slender, perianth subglobose 3-fid ¼ in. diam., anthers 12 on the toothed margin of a stipitate peltate disk, fruit ovoid beaked. *Hook. f. & Thoms. Fl. Ind.* 157; *Alph. DC. in Prodr.* xiv. 1. 205; *Beddome For. Man.* 176. M. corticosa, *Bedd. Fl. Sylv.* t. 271 (*not of H. f. & T.*). M. amygdalina, *Grah. Cat. Bomb. Pl.* 175; *Dalz. & Gibs. Bomb. Fl.* 4.

On the CONCAN GHATS, *Heyne, Dalzell*, &c. TRAVANCORE MTS., alt. 2–3000 ft., *Beddome.*

Branches slender, at length glabrous. *Leaves* 2–3 in. diam., thinly coriaceous, pale brown above; midrib and spreading nerves beneath stout, tomentose when young; base acute or rounded; petiole ½–¾ in. *Male peduncle* ⅛ in.; pedicels ¼–½ in., bracteolate above the middle. *Female* flower not seen; pedicels of fruit about as long as of the male fl. *Fruit* 1–1½ in. long, ellipsoid or ovoid with a short point or beak, densely furfuraceously rusty-tomentose; pericarp thin; aril entire, except towards the lobed apex.—Wallich's specimens (from Heyne) have nearly globose fruits; the Concan and Travancore ones have longer fruits with acute tips.

26. **M. glaucescens,** *Hook. f. & Thoms. Fl. Ind.* 157; branchlets and inflorescence rusty-hoary, leaves 4–6 (rarely 12) in. linear-oblong obtuse acute or acuminate glaucous beneath, nerves 12–20 pair, male and female fl. few fascicled on a very short peduncle long-pedicelled, male perianth subglobose, female turbinate, anthers about 10 on the toothed margin of a subsessile peltate disk with a flat top, stigma subsessile peltate toothed, fruit small subglobose, aril nearly complete. M. intermedia β. minor, *Miquel Fl. Ind. Bat.* i. 270. ? M. sumatrana, *Blume Rumph.* i. 187. M. corticosa, *in part, Hook. f. & T. l. c.* 158; *Alph. DC. in Prodr.* xiv. 1. 205, *in part*; *Kurz For. Fl.* 284. M. missionis ? & lanceolata, *Wall. Cat.* 6788, 6794. ? M. angustifolia, *Roxb. Fl. Ind.* iii. 847. ? Knema glaucescens, *Jack in Mal. Misc.* No. vii. 35, and in *Hook. Comp. Bot. Mag.* i. 149 (*not of Wallich*). ? K. corticosa, *Lour. Fl. Coch.* 742.

TENASSERIM, *Griffith, Helfer* (*Kew Distrib.* 4343, 4344, 4349), &c. ANDAMAN ISLANDS, *Kurz.* SINGAPORE, *Wallich.* MALACCA, *Griffith* (*Kew Distrib.* 4343), *Cumming* (No. 2315), *Maingay* (*Kew Distrib.* 1280, 1282, 1299). SINGAPORE, *Wallich, Murton.*—DISTRIB. Sumatra, Java.

I have retained the name adopted for this plant in the "Flora Indica," though there is no certainty of its being the *Knema glaucescens* of Jack; it, however, agrees with it in the important character of its very small fruit, which is ovate-oblong as described in the Flora, or nearly globose or ellipsoid (*Kurz*). It is no doubt the *M. lanceolata* and probably *missionis* of Wallich; the latter, from Heyne's Herbarium, was probably collected in the Straits and sent to that missionary. Whether it is the *M. sumatrana* of Blume and *M. angustifolia* of Roxburgh is altogether doubtful. The copious specimens received since the date of the "Flora Indica," show that the Tenasserim and Malayan plants included under *M. corticosa* in that work are not different from *M. glaucescens*. With regard to *M. glauca*, Blume, referred also in that work to *M. corticosa*, its fleshy aril divided low down should (according to his plate) separate it from *glaucescens*, but Javanese specimens named *glauca* and *corticosa* by Miquel and others only differ from the Indian plant in the larger fruit, and Kurz describes the aril of *corticosa*, H. f. & T., as "blood-red somewhat fleshy and lacerate;" and as to Loureiro's *Knema corticosa*, much more complete specimens are wanted before it can safely be identified with any Malayan species. The Andaman specimen of Kurz has leaves fully a foot long. The small leaves, subglobose male flowers ¼ in. diam., and turbinate female ones ¼ in. long, together with the subsessile or short styled peltate stigma, and small fruit ⅜ in. long, with their furfuraceous pericarp and almost entire thin aril, well distinguish this species, whose proper name can only be determined when more is known of the plants quoted under it.

27. **M. laurina,** *Blume Rumph.* i. 139, t. 61; branches inflorescence and leaves beneath especially the nerves scurfily tomentose, leaves 9–12 in. oblong or linear-oblong acute or acuminate glaucous beneath, nerves 20–30 pair, base rounded or cordate, fruit 2–3 in. long subsessile on tubercles of the branch oblong-ovoid, pericarp thick densely scurfily tomentose, aril scarlet entire except at the lacerate tip, seed oblong. *Alph. DC. in Prodr.* xiv. 1. 206; *Miquel Fl. Ind. Bat.* i. 2. 70. M. tomentosa, *Blume Bijd.* 577 (*not of Thunb.*).

MALACCA, *Maingay* (*Kew Distrib.* 1294).—DISTRIB. ? Java, Sumatra.

Without flower it is not possible to identify this, which may be a form of *M. furfuracea,* with any described plant. It agrees with Blume's figure and description of *M. laurina,* except in the more numerous nerves, and very much longer fruit. A plant from the Andamans, collected and named *M. laurina* by Kurz, resembles the Malacca plant except in the fruit, which is that of *glaucescens,* to which I refer it.

28. **M. intermedia,** *Blume Rumph.* i. 187; glabrous except the inflorescence and fruit, leaves 6–12 in. linear-oblong acuminate glabrous glaucous beneath, nerves 12–20 pair, male fl. ⅙ in. diam. fascicled on tubercles of the branches pedicelled 3-gonously globose scurfily tomentose 3-cleft, anthers 12–18 on the toothed margin of a peltate disk with a pyramidal boss, fruit pedicelled ovoid-oblong finely pubescent base intruded. *Hook. f. & T. Fl. Ind.* 158; *Alph. DC. in Prodr.* xiv. 1. 206; *Miquel Fl. Ind. Bat.* i. 270 (*excl. var. β.*).

MALACCA, *Griffith* (*Kew Distrib.* 4359), *Maingay* (*Kew Distrib.* 1281, 1288). SINGAPORE, *Lobb.*—DISTRIB. Java.

Branchlets usually slender. *Leaves* narrow, ¾–2½ in. broad, rarely elliptic-oblong, very coriaceous, nerves strong, base acute obtuse or rounded, pale brown and shining with very prominent closely reticulated nerves above; petiole ⅓–¾ in., stout, quite glabrous. *Male fl.* rufous-tomentose, pedicel ⅙–⅓ in., stout, bracteolate in the middle; perianth subpyramidal; staminal disk subsessile, circular or trigonous, central boss 3-gonous; anthers short. *Fruit* 1¼ in. long, broadly oblong with a groove on one side, top rounded; aril thin, entire except at the tip.—The tubercles from which the flowers spring are often diseased and present a mass of brown floccose hairs, probably caused by insect puncture.

29. **M. gibbosa,** *Hook. f. & Thoms. Fl. Ind.* 158; glabrous except the inflorescence and fruit, leaves linear-lanceolate acuminate at both ends hardly glaucous beneath, nerves 15–30 pair, male fl. pedicelled fascicled on a peduncle urceolately campanulate 3-fid, anthers 10–12 on the margin of a long-stalked circular disk, fruit pedicelled oblong base gibbous and intruded. *Alph. DC. in Prodr.* xiv. 1. 205.

KHASIA MTS., *Griffith* (*Kew Distrib.* 4348); near Churra, *J. D. H. & T. T.* PEGU, *M'Clelland.*

Branchlets slender, glabrous. *Leaves* long and narrow, 1½–2 in. broad, thinly coriaceous, nerves strong, pale brown, hardly shining above, sometimes a little glaucous beneath, nerves slender; petiole ⅓–¾ in., slender, glabrous. *Male fl.* ¼ in. long, rufous-pubescent, a good deal like the female of *M. glaucescens,* constricted below the 3-fid limb; pedicel of antheriferous disk clavate. *Fruit* 1–1½ in. long, rather like *M. intermedia,* but gibbous at the base; aril entire, except at the top.

30. **M. furfuracea,** *Hook. f. & Thoms. Fl. Ind.* 159; branchlets petioles and inflorescence densely scurfily tomentose, leaves 6–14 in. linear-oblong obtuse acute or acuminate glaucous beneath, nerves 10–40 pair, male fl. fascicled on short peduncles or tubercles globosely 3-gonous 3-fid pedicelled, anthers about 10 on the toothed margin of a 3-gonous peltate shortly itate disk, fem. fl. larger sessile on tubercles, stigma sessile discoid

crenulate. *Alph. DC. in Prodr.* xxiv. 1. 206. M. longifolia, *Hook. f. & T. Fl. Ind.* 156 (*the Malayan plant*). Knema glaucescens, *Wall. Cat.* 6810 (*not of Jack*).

PENANG, *Porter*. MALACCA, *Griffith* (*Kew Distrib.* 4346, ? 4345), *Maingay* (*Kew Distrib.* 1287). SINGAPORE, *N. Cantley*.

Branchlets stout, older with black shining cracked bark. *Leaves* most variable in size, ¾–1½ in. diam., usually pale brown and shining above, base acute obtuse or cordate; nerves strong, arched; petiole usually very short, thick, and thickly furfuraceous, but sometimes more slender and glabrate. *Male fl.* about ⅛ in. diam., pedicels ¼–⅓ in., bracteolate about the middle; antheriferous disk orbicular or 3-gonous, flat; pedicel short but distinct. *Fem. fl.* ovoid, nearly ⅛ in. long; stigma concave, many-toothed. *Fruit* 1½ in. long, ovoid-oblong, densely scurfily tomentose; pericarp thick; aril entire except at the tip.—The black bark of the older branchlets seems a good character for this species. Griffith's No. 4345, from Malacca, has very numerous crowded flowers on a very short thick peduncle, with pedicel ½ in. long, and 18 anthers on a less toothed disk.

DOUBTFUL, INDETERMINABLE AND EXCLUDED SPECIES.

M. FINLAYSONIANA, *Wall. Cat.* 6793, is *Melodorum fulgens* H. f. & T. (see vol. i. p. 82).

M. EUGENIÆFOLIA, *Alph. DC. in Prodr.* xxiv. 1. 190, described from leaf and fruit only, and placed in Section *Eumyristiceæ*, is indeterminable.

M. GLAUCESCENS, *Wall. Cat.* 6790, is *Tetranthera venulosa*, Meissn.

M. HEYNEANA, *Wall. Cat.* 6789; *Alph. DC. l. c.* 207, without flower or fruit, is probably Laurineous.

M. HOOKERI, *Wall. Cat.* 6802 B, is undeterminable.

M. INTEGRIFOLIA, *Steud. Nom.*, is *Myrica integrifolia*, Wall.

M. MICRANTHA, *Wall. Cat.* 6807; *A. DC. l. c.* 208, is a Siam plant, and not Indian.

M. MONTANA, *Roxb. Fl. Ind.* iii. 846; *Wall. Cat.* 6792, is referred by A. DC. (*Prodr.* xxiv. 1. 190) to *M. iners*, Blume. It has not been found in British India.

M. ? OBTUSIFOLIA, *Wall. Cat.* 6808; *H. f. & T. Fl. Ind.* 163; *A. DC. l. c.* 194, from Singapore, is indeterminable.

M. SAPIDA, *Steud. Nom.*, is *Myrica sapida*, Wall.

M. SESQUIPEDALIS, *Wall. Cat.* 6809 "an Laurin. fam.," from Penang, is *Actinodaphne sesquipedalis*, Hk. f. & T.

MYRISTICA ? *Wall. Cat.* 9017, from Silhet, *Gomez*, is not of this genus.

MYRISTICA; Malacca, *Maingay* (*Kew Distrib.* 1298), in fruit only, is a very fine probably new species, with very coriaceous large glabrous leaves rounded at the base, dark brown when dry, and oblong fruit 2½ in. long, in large long-peduncled panicles; pericarp very thick; seed ellipsoid, 2 in. long, beautifully mottled, pale brown and white.—The following is Dr. Maingay's description of the fruit: "ovoid-elliptic, 2 by $\frac{9}{10}$ in., dark green, perfectly glabrous, dotted with black; seed 2 in., cylindric-elliptic; aril complete, fleshy, blood-red, tip lacerate."

MYRISTICA; Malacca, *Maingay* (*Kew Distrib.* 1301), has slender pale glabrous branchlets with finely tomentose fulvous tips; elliptic pale greenish leaves 2½–3 in. long, shining above paler beneath with 6–10 pair of very slender nerves; fruit ovoid, 1–1½ in. long, long-peduncled, fascicled on a tubercle of the stem, keeled on one side and gibbous at the intruded base, pericarp thin, aril entire, seed small ovoid.—The following is from Dr. Maingay's notes: "Fruit elliptic-ovate, 1½ by 1 in., suddenly narrowed into a short stalk, keeled at the suture of the valves, pale greenish-orange, rusty-puberulous; seed $\frac{8}{10}$ by $\frac{6}{10}$ in. elliptic; aril complete, blood-red, tip lobulate, testa pale membranous, tegmen crustaceous."

MYRISTICA; Singapore, *Maingay* (*Kew Distrib.* 1297), closely resembles *M. fur-*

Var. *angustifolia*, Thwaites l. c.; leaves 4–6½ by 1–1½ in., linear-lanceolate acuminate 3-nerved from above the base, nerves parallel to the margin, cymes very slender.—Galle.

ORDER CXXVIII. LAURINEÆ.

Aromatic, erect, trees or shrubs (except *Cassytha*). *Leaves* alternate, rarely opposite or deciduous, gland-dotted, exstipulate. *Flowers* (except *Cassytha* and *Hernandia*) 1–2-sexual, regular, in axillary cymes clusters panicles or racemes; bracts 0 or deciduous, often involucriform. *Perianth* inferior, tube sometimes enlarged in fruit; limb usually 6-cleft. *Stamens* usually a multiple of the perianth-lobes, in 2–4 series on the tube, filaments flattened; inner or some or all the filaments often 2-glandular at the base; anthers erect, 2–4-celled (1-celled in *Syndiclis*), cells opening by upcurved at length deciduous lids. *Ovary* sessile in the base of the perianth-tube, 1-celled; style terminal, stigma simple or discoid or dilated; ovule solitary, pendulous from the top of the cell, anatropous. *Fruit* on an often thickened peduncle, fleshy or dry, indehiscent, naked or (in *Cryptocarya*) enclosed in or adnate to the perianth-tube. *Seed* pendulous, testa membranous, albumen 0; cotyledons plano-convex, fleshy, radicle superior minute.—Genera 34, species about 900.

The species of this Order are very difficult of discrimination without fruits, and the genera are in some cases far from natural; the character of 2- and 4-celled anthers separating generically plants otherwise very nearly related.

TRIBE I: **Perseaceæ.** Shrubs or trees. Third row of *stamens*, if present, with the anther-cells opening outwards by valves. *Inflorescence* lax-fld.

* *Anthers* 2-celled. *Fruit* enclosed in the perianth-tube.

Perianth-segments 6, subequal . . . . 1. CRYPTOCARYA.

** *Anthers* 2- rarely 1-celled. *Fruit* not enclosed wholly in the perianth-tube.

† *Stamens 9 in 3 series; 4th series 0 or of staminodes only.*

Staminodes ovate or cordate. Fruiting perianth 6-fld., enlarged . . . . 2. APOLLONIAS.
Staminodes ovate or cordate. Fruiting perianth not enlarged . . . . 3. BEILSCHMIEDIA.
Staminodes 0 or imperfect. Fruiting peduncle swollen . 4. DEHAASIA.

†† *Perfect stamens* 3; *anthers* 2-*celled* . . . 5. ENDIANDRA.

††† *Perfect stamens* 4; *anthers* 1-*celled* . . . 6. SYNDICLIS.

*** *Anthers* 4-celled. *Perfect stamens* 9.

Fruiting perianth with deciduous lobes and persistent base wholly or in part . . . . 7. CINNAMOMUM.
Fruiting perianth with persistent, reflexed lobes . . . . 8. MACHILUS.
Fruiting perianth with persistent, erect lobes . . . . . 9. PHŒBE.
Fruiting perianth wholly deciduous; pedicel greatly thickened . . . . 10. ALSEODAPHNE.

TRIBE II: **Litseaceæ.** All the anthers opening inwards.

* *Anthers 4-celled.*

Flowers diœcious, enclosed in densely imbricating bracts . . 11. ACTINODAPHNE.
Flowers diœcious, umbelled, umbels involucrate . . . . . . 12. LITSEA.
Flowers 2-sexual, solitary or panicled, enclosed in imbricating bracts . . . . 13. DODECADENIA.

** *Anthers 2-celled.*

Flowers umbelled, umbels involucrate . . . . 14. LINDERA.

TRIBE III. **Cassytheæ.** Twining leafless herbs or shrubs. Flowers of *Perseaceæ*.

15. CASSYTHA.

TRIBE IV. **Hernandieæ.** Trees. Anther-valves opening laterally.

16. HERNANDIA.

1. CRYPTOCARYA, *Brown.*

Evergreen trees or shrubs. *Leaves* rarely subopposite, 3- or penninerved. *Flowers* small, 2-sexual, in axillary and subterminal panicles. *Perianth* ovoid or turbinate; lobes 6, subequal. *Perfect stamens* 9, those of the 1st and 2nd series eglandular, anthers introrsely 2-celled; of the 3rd series 2-glandular, anthers extrorsely 2-celled; staminodes of 4th series stipitate. *Fruit* wholly included in and often adnate to the oblong or globose perianth-tube.—Species about 40, tropical and subtropical.

A. Species of North-Eastern India and the Malay Peninsula.

* *Adult leaves tomentose or pubescent, at least on the nerves and midrib beneath.*

1. **C. Griffithiana,** *Wight Ic.* t. 1830; branchlets inflorescence and leaves beneath densely rusty-villous, leaves 8–12 in. very coriaceous oblong caudate-acuminate shining above glaucous beneath, nerves very strong, panicles short and shortly peduncled, flowers subsessile crowded mixed with long bracts, fruit globosely flask-shaped. *Kurz For. Fl.* ii. 295. C. infectoria & caudata, *Meissn. in DC. Prodr.* xv. 1. 68.

TENASSERIM (South), *Kurz.* MALACCA, *Griffith, Maingay.*

A small evergreen tree; branchlets stout. *Leaves* 2–4 in. broad, rarely rounded-ovate, margin usually recurved; nerves 8–10 pair, sunk above; midrib rusty-pubescent, tip sometimes 1 in. long; petiole ⅓ in., very stout. *Panicles* 1–2 in., oblong. *Flowers* about ⅛ in. diam., perianth-tube very short. *Fruit* globose, narrowed into a thick neck exactly like a round-bellied flask, 2–3 in. diam., smooth, black, shining, pedicel and peduncle greatly enlarged.—Wight was the first to publish this as *Griffithiana.* Meissner, supposing it to be Blume's *Cylicodaphne infectoria* (Mus. Bot. ii. 11), has adopted (from Miquel) that specific name. I have seen no authentic specimen of Blume's plant, of which Meissner makes a variety *C. infectoria β. acuminata,* giving Borneo as the habitat; but the Borneo plant differs from the Malaccan not only in the short apex of the leaf, but in the elliptic or oblong fruit.

2. **C. impressa,** *Miquel Fl. Ind. Bat.* i. 923; branchlets inflorescence and leaves beneath densely finely rusty-tomentose, leaves 3–6 in. very coriaceous elliptic or oblong shortly acuminate opaque above, nerves 4–6 pair very strong beneath, panicles often equalling the leaves loosely branched, flowers pedicelled, bracts deciduous. C. infectoria γ. opaca, *Meissn. in DC. Prodr.* xv. 1. 69. C. venosa, *Meissn. mss.*

MALACCA, *Griffith* (*Kew Distrib.* 4277), *Maingay* (*Kew Distrib.* 1250).—DISTRIB. Sumatra.

Referred by Meissner to a form of his *infectoria,* but abundantly distinct in the short tomentum, much smaller leaves opaque above, with short points, petioles twice as long, long loose panicles, and smaller flowers. The fruit is undescribed.—King regards this as *C. crassinervia,* Miquel, of Sumatra, and he may be right. I have seen no authentic specimens of either *impressa* or *crassinervia.*

3. **C. andamanica,** *Hook. f.*; branchlets inflorescence and leaves beneath densely rusty-tomentose, leaves 3–5 in. coriaceous linear-oblong acute shining flat and even above subglaucous beneath, nerves 10–14 pair strong beneath, panicles peduncled compound shorter than the leaves, flowers pedicelled, fruit long-pedicelled narrowly ellipsoid. C. tomentosa, *Herb. Hort. Calc., not of Blume.*

ANDAMAN ISLANDS, *Herb. Hort. Calcutt.*

Branchlets stout. *Leaves* 1½–2½ in. broad, very pale on both surfaces when dry, margins flat, nervules beneath very fine. *Panicles* sometimes as long as the leaves; branches erecto-patent, rather dense-fld. *Flowers* pale when dry, $\frac{1}{10}$ in. long; tube of perianth shorter than the lobes. *Fruit* 1–1½ in., subacute at both ends, quite smooth; peduncle ½ in., swollen.—This differs from *C. tomentosa* in the more numerous nerves and shape of the leaves.

4. **C. rugulosa,** *Hook. f.*; branchlets and leaves beneath finely rusty-pubescent, leaves 3–5 in. linear-oblong acute or acuminate rugose and shining above, beneath with 5–8 pairs of strong nerves, panicles hoary rather slender much branched as long as the leaves, flowers pedicelled minute, fruit globosely flask-shaped.

MALACCA, *Maingay* (*Kew Distrib.* 1262).

A very distinct species, allied to *C. Griffithiana,* but much smaller in all its parts, not villous, with slender much-branched panicles of very small pedicelled flowers; the fruit is of nearly the same shape, but only ¾ in. long.—King takes this to be Miquel's *C. impressa* of Sumatra; he may be right, but it differs from the description.

5. **R. Ferrarsi,** *King in Herb. Hort. Calcutt.*; branchlets and leaves beneath very finely rusty-pubescent, leaves 6–9 in. thinly coriaceous narrowly linear-oblong narrowed into the petiole acute or acuminate flat and smooth above subglaucous beneath, nerves 12–15 pair tomentose beneath, panicles very long-peduncled, fruit small narrowly ovoid.

ANDAMAN ISLANDS, *Herb. Hort. Bot. Calc.*

A shrub; branches elongate. *Leaves* about 2 in. broad, pale above, not shining; base very acute; petiole ½–¾ in., pubescent. *Fruiting panicle* 4–6 in. *Fruit* ½ in. long, smooth, even, obtuse; peduncle ¼ in., stout.

** *Adult leaves quite glabrous beneath.*

6. **C. amygdalina,** *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laurin.* 208; branchlets and inflorescence hoary-pubescent, leaves 3–8 in. coriaceous elliptic or oblong acute or obtuse quite glabrous shining above opaque beneath with 6–10 pair of strong straight very oblique nerves, panicles as long as the leaves long-peduncled, fruit elliptic or cylindric-oblong. *Meissn. in DC. Prodr.* xv. 1. 72 and 507. C. floribunda, *Nees l. c.*; *Meissn. l. c.* 71. Laurus amygdalina, *Ham. in Wall. Cat.* 2585. L. floribunda, *Wall Cat.* 2593, *in part.*

NEPAL, *Wallich.* SIKKIM; at the foot of the hills, *King.* ASSAM, SILHET and the KHASIA MTS., *Hamilton, Wallich, Griffith.* ? ANDAMAN ISLANDS, *Herb. Hort. Bot. Calc.*

A tree; branches spreading. *Leaves* rigid, pale brown (not glaucous) beneath; base acute or obtuse; nervules faint, costa sometimes faintly hairy; petiole ¼–½ in., hoary. *Panicles* long-peduncled, often very large and much branched, pedicels jointed. *Flowers* ⅒ in.; perianth-tube as long as the lobes. *Fruit* ¾ in. long, very shortly pedicelled, obtuse, quite smooth and even.—The Andaman specimens have much longer and more coriaceous leaves, 6–7 in. long, and a more turgid fruit; they may prove specifically distinct.

7. **C. enervis**, *Hook. f.*; branchlets slender and leaves quite glabrous, leaves 4–5 in. elliptic-lanceolate caudate-acuminate base narrowed into the slender petiole subglaucous beneath, nerves 6–8 pair very faint on both surfaces, fruit globose.

Malacca, *Griffith* (*Kew Distrib.* 4336).

Branches black when dry. *Leaves* thinly coriaceous, 1½–2 in. diam., brownish green, smooth and even above when dry with faintly raised obliquely arching nerves, violet brown beneath, with very faint nerves and obsolete nervules; petiole ⅛ in. *Panicles* apparently slender and shorter than the leaves. *Fruit* ⅓ in. diam., smooth, even, not shining, with an obtuse very short tip.—A very distinct species, without flowers, remarkable for the slender branches and very faint nerves of the leaf.

8. **C. Kurzii**, *Hook. f.*; branchlets slender black and leaves glabrous, leaves shortly petioled 4–8 in. oblong or linear-oblong or -oblanceolate obtusely acuminate smooth and shining above, glaucous brown beneath, nerves about 8 pair strong beneath, panicles shorter than the leaves nearly glabrous, flowers minute hoary. C. Wightiana, δ. Griffithii, *Meissn. in DC. Prodr.* xv. 1. 70 (*excl. the Canara plant*). C. ferrea, *Kurz For. Fl.* ii. 295 (*not of Blume*).

Tenasserim; Mergui, *Griffith* No. 1142 (*Kew Distrib.* 4274).

Branchlets black when dry. *Leaves* 1½–2½ in. diam., thinly coriaceous, base acute; nerves oblique, finely reticulated beneath; petiole ¼ in., stout. *Flowers* pedicelled, 1/12 in. long.—This may, as Kurz holds, be referable to *C. ferrea*, which it is very near; but in all the (indifferent) specimens of *ferrea* that I have seen, the branches are stouter and pale when dry, the panicle pubescent and flowers larger. Without knowing the fruit (which is linear-oblong and ¾ in. long in *C. ferrea* var. *Mentek*) it is impossible to identify this with the Javanese plant. It differs entirely from *Wightiana* in foliage and pubescence of panicle.

9. **C. ferrea**, *Blume Bijd.* 557 ?; branchlets stout pale and panicle pubescent or puberulous, leaves 4–8 in. glabrous linear- or elliptic-oblong or lanceolate obtusely acuminate smooth hardly shining above glaucous brown beneath, nerves 8–12 pair strong beneath, panicles often equalling the leaves hoary, flowers minute, fruit (in Java specimens) linear-oblong. *Meissner in DC. Prodr.* xv. 1. 69; *Nees Syst. Laurin.* 216; *Miquel Fl. Ind. Bat.* i. 921.

Malay Peninsula; Pomorong Johore, *Cantley* (No. 8).

Under *L. Kurzii* I have indicated the differences between that and this, which quite agrees with Javan specimens of *ferrea*, though it is impossible to identify it certainly without the fruit.

10. **C. cæsia**, *Blume Bijd.* 335 ?; whitish, branchlets petioles and panicles rusty-pubescent, leaves 5–7 in. glabrous oblong or elliptic-oblong acuminate smooth above glaucous white beneath, nerves 6–10 pair arched and strong beneath, nervules very fine, panicles often longer than the leaves, flowers hoary, fruit globose. *Meissn. in DC. Prodr.* xv. 1. 71; *Miquel Fl. Ind. Bat.* i. 925.

Andaman Islands; *Herb. Hort. Bot. Calc.*—Distrib. Java.

Branchlets rather stout. *Leaves* firmly coriaceous, 2–3 in. diam., base rounded or acute, midrib and nerves beneath sometimes slightly pubescent; petiole ⅓–½ in. *Panicles* large with spreading branches; flowers ⅙ in. long, pedicelled. *Fruit* fleshy,

¾ in. diam.—King notes this as either *cæsia* or a new species; it agrees with Blume's character of *cæsia* except in that the midrib beneath is almost quite glabrous. The fruit of the Javan plant being unknown, the identification is not sure. A similar plant, but with shorter petioles, more nerves and more pubescent flowers, occurs in Celebes. Meissner regards the Javan *cæsia* as perhaps a var. of *ferrea*, from which the Indian plant seems to be very distinct.

11. **C. ? Andersoni,** *King in Herb. Hort. Bot. Calc.*; very robust, leaves 8–12 in. long-petioled glabrous elliptic acute at both ends thickly coriaceous finely reticulated above red-brown beneath with 10 pairs of very oblique stout nerves and transverse nervules, panicle very large stout corymbose and much branched hoary-pubescent, flowers minute.

ASSAM, *Jenkins in Herb. Hort. Calc.*

I have seen only a leaf, a portion of a panicle and a drawing (lent by Dr. King) of this remarkable plant, which resembles no other of the Order in foliage or flowers. The panicle is 8 in. long, and must have been as broad at the top, the peduncle is as thick below as a goose-quill, black and shrunken when dry (as if soft when fresh); it branches repeatedly corymbosely from low down, the ultimate divisions flowering at the tips; the flowers are about 1/16 in. diam., on pedicels of the same length; perianth-segments oblong, obtuse; stamens short, glabrous; ovary ovoid, style short, stigma discoid.

B. Species of Ceylon and Western India.

12. **C. Wightiana,** *Thwaites Enum.* 254; branchlets and inflorescence rusty-pubescent or puberulous, leaves 4–10 in. rigidly coriaceous elliptic or oblong acuminate glabrous smooth hardly shining above, glaucous white and glabrous or faintly puberulous beneath with 6–10 pair of strong arched nerves, panicles spreading equalling or shorter than the leaves, fruit globose. *Meissn. in DC. Prodr.* xv. 1. 70 (*excl. var.* δ.); *Beddome Forest. Fl.* t. 299. C. floribunda, *Wight Ic.* t. 1829 (*not of Nees*); *Dalz. & Gibs. Bomb. Fl.* 222.

DECCAN PENINSULA; from Canara southwards. CEYLON; ascending to 5000 ft.

A tall tree; branches rather stout, often lenticellate. *Leaves* variable in breadth, 1½–4 in., strongly reticulate beneath, base rounded or acute; petiole ⅛–1 in. *Panicles* very many-fld.; flowers pedicelled, ⅛ in. long. *Fruit* ½ in. diam., smooth, black, glossy.—Wight figures and describes the Ceylon plant as having oblong fruit, as does Meissner, but Thwaites correctly states it to be globose. I have seen no fruit of Peninsular specimens. Meissner's vars. *parvifolia* and *lanceolata* are not separable from the type.

13. **C. Stocksii,** *Meissn. in DC. Prodr.* xv. 1. 71; branches and panicles rusty-tomentose, leaves 2½–4 in. rigidly coriaceous oblong obtuse or rounded at the tip glabrous smooth above, glaucous beneath with 6–7 pair of stout pubescent or glabrous nerves, panicles shorter than the leaves stout dense-fld., fruit ovoid. C. neilgherriensis, *Meissn. l. c.*

DECCAN PENINSULA; Canara, *Stocks*, &c.; Nilghiri Hills, *Wight*; Anamallay Hills, *Beddome.*

A large tree, very near *C. Wightiana*, but the leaves are much smaller, shorter-petioled, and usually very obtuse; the panicles short, contracted, and dense-fld., the flowers larger, and the fruit only ⅓ in. long and ovoid; not shining.

14. **C. membranacea,** *Thwaites Enum.* 254; branchlets slender and panicles rusty-pubescent, leaves 3–5 in. glabrous membranous elliptic-oblong acute or acuminate finely reticulated on both surfaces, beneath somewhat glaucous with 5–7 pair of strong nerves, panicles very small few-fld., fruit

oblong-ovoid. *Meissn. in DC. Prodr.* xv. 1. 72; *Beddome Forest Man.* 185.

CEYLON; in the Saffragam district, alt. 2000 ft., *Sir J. Mackenzie, Thwaites.*
A tree of middle size; branches very slender. *Leaves* 1¼–2 in. diam., hardly shining but beautifully reticulated above, reddish brown, base narrowed into a slender petiole of ¼–⅓ in. *Panicles* ⅓–½ in. long, few and lax-fld.; flowers pedicelled, ⅒ in. long. *Perianth-tube* rather longer than the limb. *Fruit* (not seen) about ½ in. long, black-purple.

DOUBTFUL SPECIES.

CRYPTOCARYA sp., from the Anamallay Hills, alt. 3000 ft., *Beddome,* closely resembling *C. Griffithiana,* Wight, but in too young a state for determination.

CRYPTOCARYA sp., from Tenasserim, alt. 5000 ft., *Beddome,* a fragment in flower with very membranous leaves, resembles *C. costata,* Blume, of Java.

2. APOLLONIAS, *Nees.*

Evergreen trees. *Leaves* scattered, penninerved. *Flowers* 2-sexual, small, in axillary and subterminal panicles. *Perianth-tube* short; lobes 6, subequal. *Perfect stamens* 9; filaments filiform, 1st and 2nd series eglandular with introrse 2-celled anthers, of 3rd series 2-glandular with extrorse 2-celled anthers, staminodes of 4th series ovoid or cordate. *Berry* globose or ovoid, with the 6-cleft hardened perianth at its base.—Species 2, a Canarian and the following.

A. Arnottii, *Nees Syst. Laurin.* 670; quite glabrous or young parts sparsely hairy, leaves lanceolate acuminate, panicles few-fld. long-peduncled. *Meissn. in DC. Prodr.* xv. 1. 65; *Wight Ic.* t. 1819; *Beddome Forest. Fl.* t. 291.

DECCAN PENINSULA; Malabar, Tinnevelly and Travancore, *Wight.*
Leaves 3–5 by ¾–1¼ in., thinly coriaceous, young red-brown when dry, with sparse silky hairs beneath and on the young panicles, old quite glabrous, greenish-brown when dry, both ends very acute; nerves prominent but very slender on both surfaces; petiole ¼–½ in. *Panicles* 1–2 in., slender, erect or spreading, sparingly branched; flowers pedicelled, ⅛–⅙ in. diam. *Fruit* ¼–⅓ in. long, ovoid, acute, girt at the base by the hardened perianth.—This I should regard as forming (along with the Canarian species) a section of *Phœbe* with 4-celled anthers, which would, however, upset the present artificial arrangement of the genera in the Order.

3. BEILSCHMIEDIA, *Nees.*

Evergreen trees or shrubs. *Leaves* alternate or opposite, penninerved. *Flowers* small, 2-sexual, fascicled or panicled. *Perianth-tube* short; lobes 5, subequal. *Perfect stamens* 9; filaments of 1st and 2nd series eglandular with introrse 2-celled anthers, of 3rd series 2-glandular with extrorse anthers; staminodes of 4th series ovoid or cordate. *Fruit* ovoid oblong or globose, perianth wholly deciduous.—Species about 20, all tropical.

Sect. I. *Leaves* opposite or alternate; terminal buds very small, pubescent or tomentose, not enclosed in coriaceous scales (except *B. Clarkei*). *Flowers* ⅙–⅓ in. diam., broadly campanulate or cup-shaped.

* *Perianth cleft nearly to the base into linear or oblong segments.*

1. **B. Roxburghiana,** *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laurin.* 198; terminal buds and inflorescence tomentose, leaves 7–9 in. ovate or ovate-lanceolate or elliptic-oblong obtusely acuminate shining and finely reticulate on both surfaces, panicles short shortly peduncled, fruit

2 in. long cylindric-oblong. *Meissn. in DC. Prodr.* xv. 1. 63 (*excl. β*); *Wight Ic.* t. 1828; *Kurz For. Fl.* ii. 293; ? *Brandis For. Fl.* 378; *Gamble Man. Ind. Timb.* 309. Laurus bilocularis, *Roxb. Fl. Ind.* ii. 311.

ASSAM; at Negrigam, &c., *Griffith*. TIPPERA, *Roxburgh*. TENASSERIM, *Helfer* (*Kew Distrib.* 4335).

A deciduous tree, branches woody. *Leaves* 2½–3½ in. broad, firmly coriaceous; nerves 10–12 pair, slender and prominent on both surfaces; base acute, rarely rounded, sometimes unequal-sided; petiole ½–1¼ in. *Panicles* 1–1½ in., subsilkily tomentose; bracts small, broad, caducous; pedicels as long as the flowers. *Perianth* ⅙ in. diam.; segments linear-oblong obtuse, hairy on both surfaces. *Stamens* pubescent; staminodes conical, tomentose. *Ovary* glabrous, stigma simple. *Fruit* pruinose, purple.—Wight's figure, copied from Roxburgh's drawings, represents the sepals as acute. Brandis and Gamble give Sikkim, ascending to 8000 ft., as its locality, and Kurz adds the Andaman Islands; the latter is likely, but not the former; and these *Laurineæ* are so very difficult of discrimination, that I suspect all unlikely habitats, to which may be added those of the Forests of Kumaon, Oude, and Nepal, mentioned by Brandis. (See *B. sikkimensis*.)

2. **B. fagifolia,** *Nees in Wall. Pl. As. Rar.* ii. 69, and *Syst. Laur.* 200; terminal buds and inflorescence pubescent, leaves 3–4 in. elliptic or elliptic-lanceolate obtusely-acuminate, panicles very short crowded subsessile, young flowers enclosed in broad silky caducous scales, fruit ¾ in. ellipsoid-oblong. *Meissn. in DC. Prodr.* xv. 1. 64. Tetranthera fagifolia, *Wall. Cat.* 2539.

SILHET, *De Silva*. ? ASSAM, *Jenkins*.—DISTRIB. ? Munnipore.

A little known tree, very closely allied to *B. Roxburghiana*, but it has smaller more elliptic leaves on shorter petioles, very small panicles, and the bracts are apparently much larger and broader. The Silhet specimens are in flower only, they have very glabrous shining leaves 2½–3 in. long; the Assam ones are in fruit only, they have leaves 3–4½ in. long, sparsely puberulous beneath; the Munnipore ones (in flower) have more lanceolate shining glabrous leaves with shorter thicker petioles. The following variety strengthens my suspicion (shared by Kurz), that *fagifolia* and *Roxburghiana* are forms of a wide-spread Indian forest tree.

Var. ? *Dalzellii*, Meissn. in DC. l. c. (*excl. the Assam plant*); leaves 4–7 in. oblong or lanceolate very coriaceous and shining, base acute or obtuse, nerves more numerous, fruit 1–1½ in. ellipsoid-oblong or globose. B. fagifolia, *Beddome, Forest. Fl.* t. 263. B. Roxburghiana, *Dalz. & Gibs. Bomb. Fl.* 222.—Deccan Peninsula, in forests of the Western Ghats from the Concan southwards.—The flowers of this are identical with those of *B. fagifolia*, but if the Assam specimens of the latter plant are true, the fruit is considerably larger and broader. Dalzell describes it as a large forest tree. The Assam plant referred here by Meissner, is, I think, typical *fagifolia*.

3. **B. Clarkei,** *Hook. f.*; terminal buds and inflorescence tomentose, leaves 5–7 in. subopposite membranous elliptic-lanceolate acuminate not shining reticulate on both surfaces, panicles 3–4 in. peduncled lax-fld.

SIKKIM HIMALAYA; Reinak, alt. 4500 ft., *Clarke*.

A tree, 80 ft.; branches slender, rough, tips tomentose; bud-scales lanceolate, ⅛ in. long. *Leaves* thinner in texture than in any other Indian species, 1½–2 in. diam., very acute at both ends, beautifully reticulated with 10–12 pairs of nerves, dull green when dry; petiole ⅛–⅓ in., slender, pubescent. *Panicles* 12–20-fld., suberect, not densely tomentose; peduncle short and branches rather stout; flowers pedicelled. *Perianth* cup-shaped, ¼ in. diam., cleft nearly to the base; segments oblong, obtuse. *Filaments* broad, hairy; staminodes ovate-hastate, glabrous. *Fruit* not seen.

4. **B. sikkimensis,** *King in Herb. Hort. Calc.*; terminal buds pale tomentose, leaves 3–4 in. opposite elliptic oblong obtuse or subacute base obtuse or rounded opaque above, nerves strong beneath, fruit ellipsoid.

SIKKIM HIMALAYA and EAST NEPAL; alt. 4–5000 ft., *J. D. H.*, *King.*

Possibly a form of *B. Roxburghiana*, but the branches and leaves are all opposite, and the leaves much smaller and more rounded at both ends; the fruit is 1 in. long. Dr. King's specimens are in fruit only, mine gathered in E. Nepal I noted as being exactly like a small plum.—This is probably the tree referred to *B. Roxburghiana* by Gamble and Brandis, and stated to grow at 8000 feet elevation in Sikkim.

5. **B. malaccensis,** *Hook. f.*; terminal buds and young panicles rusty-pubescent, leaves 6–9 in. thickly coriaceous glabrous elliptic-oblong obtuse or subacute, nerves very strong beneath, panicles short axillary, peduncle and divaricating branches very stout, perianth deeply cleft, segments linear-oblong sparsely pubescent. B. Roxburghiana β. ? malaccensis, *Meissn. in DC. Prodr.* xv. 1. 63.

MALACCA; *Griffith*, *Maingay* (*Kew Distrib.* 1260).

Branches very stout, woody. *Leaves* 2½–5 in. broad, rather shining above, beneath red-brown with 8–10 very stout arched nerves; petiole ½–¾ in., very stout. *Panicles* horizontal, 2–3 in. long, very stout, shortly peduncled; flowers ⅛ in. diam., broadly campanulate, stoutly pedicelled. *Filaments* hairy; staminodes stipitate. *Ovary* glabrous, style rather slender. *Fruit* not seen.—An imperfect specimen of a plant much resembling this is in Kurz's Andaman Herbarium.

6. **B. macrophylla,** *Meissn. in DC. Prodr.* xv. 1. 63; branches very stout with terminal bud and petioles rusty-pubescent, leaves 10–12 in. alternate thickly coriaceous elliptic-oblong obtusely acuminate, nerves strong beneath, panicles very short, fruit globose. *Kurz For. Fl.* ii. 294.

TENASSERIM; at Mergui, *Griffith.*

Very near *B. malaccensis*, and possibly only a large-leaved form of that plant, but without fruit of the latter they cannot be identified.

†† *Perianth-lobes short, rounded.*

7. **B. Maingayi,** *Hook. f.*; branchlets terminal buds and inflorescence densely tomentose, leaves 8–10 in. alternate thinly coriaceous elliptic-oblong brown and opaque on both surfaces, nerves beneath rather slender, panicles short stout very dense-fld., flowers mixed with short broad coriaceous tomentose deciduous bracts, perianth shortly cleft, lobes rounded densely pubescent.

MALACCA, *Maingay* (*Kew Distrib.* 1268).

Branches very stout. *Leaves* red-brown when dry, base acute; petiole stout, ⅜ in. *Panicles* 1–1½ in., peduncle very short and branches stout. *Flowers* (in bud only) ¼ in. diam. *Filaments* hairy; staminodes stipitate.

8. **B. Brandisii,** *Hook. f.*; leaves alternate 6–10 in. elliptic-oblong acuminate glabrous, panicles short pubescent, perianth with 5 rounded lobes, fruit 2–2½ in. long oblong.

ASSAM; in the Naraber Forest, Golaghat, *Brandis.*

A moderate-sized tree. *Leaves* thinly coriaceous, base acute; nerves 8–10 pair, very slender; petiole 1–1½ in. *Flowers* about ⅛ in. diam., almost tomentose. *Ovary* glabrous. *Fruit* stoutly peduncled, obtuse, smooth.—Flowering state imperfect, but anthers clearly 2-celled, glabrous, otherwise it a good deal resembles *Alseodaphne petiolaris.*

9. **B.? longipes,** *Hook. f.*; terminal buds and panicle and leaves beneath ashy-pubescent, leaves 5–7 in. coriaceous elliptic-lanceolate acuminate base cuneate shining above, nerves beneath very strong, panicles 6 in. long stout, branches distant few-fld., perianth shortly cleft, lobes rounded densely tomentose.

Malacca, *Maingay* (*Kew Distrib.* 1248).

Branches rather stout. *Leaves* 7–8 by 2½–3½ in., usually broadest above the middle, pale greyish green above, beneath pale brown, nerves oblique, 10–12 pair; petiole stout, ½–¾ in. *Panicles* axillary, 5 in. long, erect, narrow; peduncle and rachis rather stout, branches very short, few-fld.; flowers $\frac{1}{10}$ in. diam.; pedicel short, stout. *Perianth* cup-shaped, cleft to about the middle. *Filaments* pubescent, glands sessile; staminodes minute. *Ovary* glabrous, style minute. *Fruit* unknown.—In the absence of fruit the genus is doubtful.

Sect. II. *Leaves* usually opposite; terminal buds enclosed in large glabrous coriaceous concave scales. *Flowers* about $\frac{1}{10}$ in. diam., subglobose. (I suspect that this section may constitute a genus.)

10. **B. oppositifolia,** *Benth. in Gen. Pl.* iii. 152; quite glabrous, terminal buds lanceolate, leaves opposite lanceolate or oblong-lanceolate obtuse shining and reticulate on both surfaces, panicles long-peduncled slender, branches spreading, flowers minute, fruit cylindric-oblong, pedicel thickened clavate. Haasia oppositifolia, *Meissn. in DC. Prodr.* xv. 1. 61; *Beddome For. Man.* 184. Apollonias zeylanica, *Thwaites Enum.* 253.

Ceylon; Central Province, alt. 3–4000 ft., *Thwaites.*

A tree, 50–60 ft.; branches rather slender, bud-scales linear-oblong concave, very rigid. *Leaves* 5–7 by 1–2¼ in., thinly coriaceous, alike in colour &c. on both surfaces; base acute; nerves 6–8 pair, very slender and oblique; petiole ½–¾ in. *Panicles* 4–6 in. long, and flowers nearly black when dry; branches divaricate; pedicels 2–3 times as long as the subglobose flower, which is about $\frac{1}{12}$–$\frac{1}{10}$ in. diam. *Perianth* wholly deciduous; lobes rounded, obscurely pubescent. *Stamens* glabrous, glands and staminodes sessile. *Fruit* ¾–1¼ in. long, sometimes subclavate, pedicel ¼ in. long.

11. **B. Wightii,** *Benth. in Gen. Pl.* iii. 152; quite glabrous, terminal buds lanceolate, leaves opposite elliptic or elliptic-lanceolate obtusely acuminate shining and reticulate on both surfaces, panicles long-peduncled slender, branches spreading, flowers minute. Haasia Wightii, *Nees Syst. Laur.* 676; *Meissn. in DC. Prodr.* xv. 1. 61; *Beddome Forest Fl.* t. 298.

South Deccan Peninsula; Travancore, Tinnevelly and Anamallay Hills, *Wight, Beddome.*

Except in the form of the leaves this seems to be *B. oppositifolia,* but without seeing fruit I hesitate before uniting them.

12. **B. assamica,** *Meissn. in DC. Prodr.* xv. 1. 64; quite glabrous, terminal buds lanceolate, leaves opposite elliptic-ovate or lanceolate obtusely acuminate shining and reticulate on both surfaces, fruit 1¼ in. long very shortly pedicelled elliptic- or ovoid-oblong tip rounded or subacute base shortly contracted pericarp thick.

Assam, *Jenkins.*—Distrib. Burma (*Griffith*), Munnipore.

Branches rather slender, terminal compressed; buds ½ in. long, scales very coriaceous, linear-oblong, quite glabrous. *Leaves* 5–6 in., firmly coriaceous, pale brown when dry, base cuneate; nerves about 10 pair, very slender, equally prominent on both surfaces; petiole ¾ in., slender. *Flowers* unknown.

13. **B. Gammieana,** *King in Herb. Hort. Calc.*; quite glabrous, terminal buds ovoid, leaves opposite elliptic-oblong or -ovate obtusely acuminate shining and reticulate on both surfaces, fruit ¾ in. long shortly pedicelled globosely obovoid apiculate or mammillate.

East Nepal, on the north slope of Phulloot, alt. 6000 ft., *J. D. H.*, and Sikkim at the same elevation, *King.*

A small tree; branches stout; terminal buds ¼ in., scales glabrous very coriaceous. *Leaves* 4–6 in., firmly coriaceous, variable in breadth, colour (pale brownish yellow when dry) and reticulation the same on both surfaces; base cuneate; nerves very slender, 12–15 pair, spreading; petiole ¼–⅓ in. *Panicles* apparently (in the absence of flowers) very short, about 1 in. long in fruit, then stout and curved but not swollen.

14. **B. globularia,** *Kurz For. Fl.* ii. 294; quite glabrous, terminal buds ovoid acute, leaves opposite elliptic-oblong or lanceolate reticulate on both surfaces, fruit 1–1½ in. diam. globose very fleshy with a thick hard endocarp.

MARTABAN; on the hills, alt. 3–4000 ft., *Kurz.*

Buds of *B. Gammieana*, leaves narrower longer and less shining, fruiting panicle very short and stout.—The specimens are very imperfect, and Kurz's description is wholly insufficient; he regards it as possibly a hill form of *B. Roxburghiana*, but judging from the buds I should doubt its being of the same genus, and its close affinity to *B. Gammieana* is obvious.

4. DEHAASIA, *Blume.*

Evergreen trees. *Leaves* alternate, often fascicled at the ends of the branches, penninerved. *Flowers* small, 2-sexual, in axillary peduncled panicles. *Perianth-tube* very short; segments 6, 3 outer much the shortest. Perfect *stamens* 9, filaments of 1st and 2nd series eglandular, with 2-celled introrse anthers, of the 3rd series 2-glandular with 2-celled extrorse anthers; staminodes 0, or few and minute. *Berry* oblong, pedicel very much enlarged, coloured, perianth wholly deciduous.—Species 10, Malayan.

The 4-celled anthers alone distinguish this genus from *Alseodaphne.* The species require revision with ample materials.

1. **D. cuneata,** *Blume Rumph.* i. 164, t. 46; glabrous, leaves subverticillate cuneate-obovate much narrowed at the base obtuse acute or subacute glaucous or not beneath, panicles long-peduncled very slender, fruit ellipsoid-oblong. Haasia cuneata, *Nees Syst. Laurin.* 378. Cryptocarya cuneata, *Blume Bijd.* 558. Endiandra? Candolleana, *Meissn.* (*by error*) *ex Kurz For. Flor.* ii. 295. ? Cyanodaphne cuneata, *Blume Mus. Bot.* i. 333; *Meissn. in DC. Prodr.* xv. 1. 76; *Miquel Fl. Ind. Bat.* i. 926; ? Dictyodaphne Candolleana, *Meissn. l. c.* 30. Alseodaphne grandis, *Kurz For. Fl.* ii. 293 (*not of Nees*).

PEGU, ARRACAN and TENASSERIM, *Helfer* (*Kew Distrib.* 4270), *Kurz*, &c.—DISTRIB. Java.

Old branches stout, scarred; young elongate, stout, clothed with white bark. *Leaves* at the tips of the branches only, 4–10 by 2–5 in., hard, coriaceous, dark brown when dry, often with a violet-glaucous hue beneath, base narrowed into a petiole ½–1½ in. long, smooth and opaque above; nerves 8–10 pair, impressed above, strong beneath. *Panicles* 3–6 in., peduncle and pedicels black when dry, minutely puberulous, branches and pedicels divaricate, slender in flower; flowers subglobose, 1/14–1/12 in. diam. *Stamens* short, densely tomentose. *Fruit* 1–1½ in. long, bluish black, pruinose; swollen pedicel ¾ to 1½ in. long, straight or curved, warted.—I have doubtfully referred to this Blume's *Cyanodaphne cuneata*, suspecting that the character ascribed to the fruit (of being, as in *Cryptocarya*, enclosed in the perianth-tube) is founded in error; Blume's Javanese flowering specimens of *Cyanodaphne cuneata* (I have seen no fruit from him) are identical with the Indian *D. cuneata*, and the fruit I have described unquestionably belongs to it. Kurz quotes Meissner's authority for *Endiandra? Candolleana*, intending no doubt *Dictyodaphne Candolleana*, an obscure Burmese plant for which Meissner quotes the numbers 566 and 1610 of Wallich's Burma collection.

2. **D. Kurzii,** *King in Herb. Hort. Calcutt.*; glabrous, leaves subverticillate cuneate- or rhombic-obovate much narrowed at the base obtusely acuminate glaucous or not beneath, panicles long peduncled very slender, outer perianth-lobes ¼ smaller than the inner, fruit cylindric oblong.

TENASSERIM, *Helfer* (*Kew Distrib.* 4272). ANDAMAN ISLANDS, *Herb. Hort. Bot. Calc.*

Very similar to *D. cuneata*, and perhaps a variety of that plant with longer more elliptic and acuminate leaves, which in Helfer's specimens are 3–6 in. long, but in the Andaman ones 6–10 in. The fruit of the Andaman plant is 2 in. long, with a stout fleshy warted pedicel 1 in. long.

3. **D. elongata,** *Blume in Nees Syst. Laur.* 377, and in *Rumphia* i. 163, t. 47; characters of *D. cuneata*, but fruit globose on a very short pedicel. *Meissn. in DC. Prodr.* xv. 1. 60 (*Haasia*); *Miquel Fl. Ind. Bat.* i. 929 (*Haasia*).

ANDAMAN ISLANDS, *Herb. Hort. Calc.*—DISTRIB. Sumatra.

Dr. King suspects this to be a form of *D. cuneata*, and I think he is right; the leaves are 8–11 in. long, the flowers larger than in *D. cuneata*, the fruit 1–1½ in. diam. with a very fleshy sarcocarp and quite globose.

4. **D. microcarpa,** *Blume in Nees Syst. Laurin.* 373, and *Rumph.* i. 162, t. 44; glabrous, leaves shortly petioled elliptic-oblong acuminate not glaucous beneath, panicles shortly peduncled, outer perianth-lobes ⅓ smaller than the inner, fruit cylindric-globose. *Meissn. in DC. Prodr.* xv. 1. 60; *Miquel Fl. Ind. Bat.* i. 928. Laurus incrassata, *Jack in Mal. Misc.* ii. 7. 33? (*ex Wall. Cat.* 2589.) Persea incrassata, *Nees Syst.* 127. Machilus incrassatus, *Nees in Wall. Pl. As. Rar.* ii. 70. ? Haasia incrassata, *Nees Syst. Laurin.* 376; *Miquel l. c.* 390.

MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1274). ? Singapore, *Prince*.—DISTRIB. Sumatra, Java, Borneo.

Branches woody, white. *Leaves* not so fascicled towards the ends of the branches as in the preceding species, 9–14 by 3½–5½ in., coriaceous, base acute, smooth, greenish or pale greenish brown on both surfaces when dry; nerves about 12 pair, very prominent beneath; petiole stout, ¾–1 in. *Panicles* 2–6 in., black when dry, branches stout, spreading; pedicels obconic in flower, ¼–⅙ in. *Perianth* ⅙ in. diam., nearly glabrous; lobes broad, outer obtuse, inner subacute. *Stamens* longer and less villous than in the preceding species. *Fruit* "baccate, 1 in. long, blue-black, shining, subtended by the enlarged slightly thickened perianth, pedicel enlarged fleshy trigonous, bright scarlet warted," *Maingay*.—Though the fruit is large, I refer this to Blume's *D. microcarpa*, of which that author describes and figures apparently young fruit only; for after a most careful analysis I can find no difference between authentic specimens of Blume's plant and this; furthermore Blume states that both his figure and description of the fruit are taken from another source. *D. squarrosa*, Zoll., seems identical. Jack quotes *Rumph. Amb.* i. 162, t. 44, for his *L. incrassata*, but the plate is not characteristic, if taken for this plant.

DOUBTFUL SPECIES.

HAASIA NITIDA, *Meissn. in DC. Prodr.* xv. 1. 61, from Borneo, has 4-celled anthers and is an *Alseodaphne*.

HAASIA PEDUNCULARIS, *Nees*, *Meissn. l. c.* See *Alseodaphne peduncularis*.

5. ENDIANDRA, *Brown*.

Evergreen trees. *Leaves* alternate, penninerved. *Flowers* small, in axillary panicles. *Perianth-tube* very short; segments 6, in 2 series. Perfect *stamens* 3, all of the 3rd order, extrorsely 2-locular, filaments 2-glandular or not; staminodes 0, or 3 minute, or replaced by a fleshy ring. *Berry* oblong or subglobose, pedicel hardly thickened; perianth usually wholly deciduous.—Species about 15, Indian, Malayan, Australian and Pacific.

1. **E. firma,** *Nees in Wall. Pl. As. Rar.* ii. 68, and *Syst. Laurin.* 195;

glabrous, leaves 5–8 in. elliptic-oblong obtusely acuminate coriaceous base acute concolorous and finely reticulate on both surfaces, nerves distinct, panicles lax-fld. much shorter than the leaves. *Meissn. in DC. Prodr.* xv. 1. 79. Laurus firma, *Wall. Cat.* 2597.

SILHET, *De Silva.* CACHAR, *Keenan.*

Branches terete, woody; terminal buds small, puberulous. *Leaves* when dry red-brown on both surfaces; nerves 10–11 pair, sunk above, prominent beneath, very obliquely arched; petiole ½ in., stout. *Panicle* 1–2 in., obscurely puberulous, black when dry; branches spreading; flowers pedicelled, minutely bracteolate. *Perianth* campanulate, ¼ in. diam.; segments broadly ovate, obtuse, glabrous externally, three inner smaller, tomentose within, as is a triangular space at the base of the outer and the base of the perianth within. *Anthers* 3, sessile, subsagittately oblong, obtuse, thick, tomentose, with linear-oblong obtuse sublateral cells and oblong valves. *Fruit* (in Cachar specimen) 1¼ in. long, elliptic-ovoid, quite smooth, tip rounded.—Nees describes the leaves as sometimes opposite, and the fruit as oblong, 2 by ½ in., seated on the small orbicular base of the perianth; but Wallich's specimens, the only ones known to Nees, are in flower only (having no fruit), and all the leaves are alternate.

2. **E. Maingayi,** *Hook. f.*; leaves 3–4 in. coriaceous elliptic or elliptic-oblong obtusely subcaudate acuminate, minutely reticulated, nerves very obscure, racemes very short glabrous few-fld., perianth unequally 6-cleft, fruit 1½–2 in. oblong.

MALACCA, *Maingay* (*Kew Distrib.* 1270).

Branches rather slender. *Leaves* 1½–2 in. diam., firmly coriaceous, red-brown, shining and finely reticulated on both surfaces; nerves 8–10 pair, very slender and faintly raised on both surfaces, base acute; petiole ⅓–½ in. *Racemes* ½ in. long or less, hoary; buds globose, ⅙–⅛ in. diam. *Sepals* very coriaceous, concave. *Stamens* sessile, almost in the centre of the flower. *Ovary* sunk in the very short perianth-tube; style short, stigma minute. *Fruit* solitary, axillary, peduncles (or pedicels) not ½ in. long.

6. SYNDICLIS, *Hook. f.*

A glabrous tree. *Leaves* alternate, penninerved. *Flowers* minute, panicled, bisexual, gland-dotted. *Perianth* 4-partite, wholly deciduous; segments transversely oblong, 2-seriate, the two inner rather smaller. *Perfect stamens* 4, opposite to and as long as the perianth-lobes, broadly ovate, thick, pubescent and gland-dotted, 1-celled; cell small, opening introrsely by a single valve; staminodes 4, minute, lanceolate, hirsute. *Ovary* glabrous, tapering into an acute style.

S. paradoxa, *Hook. f. Ic. Plant.* t. 1515.

BHOTAN, *Booth.*

Branchlets slender, leafy at the tips, the very young obscurely pubescent or hoary. *Leaves* petioled, 3–5 by 2–2½ in., rather membranous, obovate-oblong, acuminate, with 10–12 pairs of slender nerves, drying pale brown, conspicuously reticulated with raised nervules on both surfaces; base acute; petiole ¼ in., slender. *Panicles* shorter than the leaves, axillary, slender, with spreading few-flowered branches; flowers ⅒ in. diam.; pedicels long, thickened under the flower. *Perianth-segments* short, broader than long, subreniform, early falling away in one piece. *Stamens* (apparently sessile anthers) very large for the size of the flower, pubescent all over except the valve, hollowed in front with the small cell towards the lip in front; valve emarginate (as if of 2 confluent valves), finally recurved over the top of the anther; staminodes, I think, alternate with the anthers.—An exceedingly curious plant, the only one of the Order with 1-celled anthers; it was in a collection of plants made in Bhotan by Mr. Booth, nephew of the late Thomas Nuttall, who gave the collection to Sir W. Hooker.

7. **CINNAMOMUM,** *Blume.*

Evergreen trees or shrubs. *Leaves* opposite or alternate, usually triple-nerved. *Flowers* small, 2-sexual or polygamous, in axillary and subterminal panicles; females usually largest, with often fewer parts. *Perianth-tube* short; segments 6, subequal. *Perfect stamens* 9 or fewer, filaments of 1st and 2nd series eglandular, with introrse 4-celled anthers; of the 3rd 2-glandular with extrorse 4-(rarely 2-)celled anthers; staminodes of the 4th series cordate or sagittate. *Fruit* seated on the enlarged perianth, the segments of which are wholly or in part deciduous, or very rarely persistent and entire.—Species about 130?, tropical and subtropical Eastern Asia, Australia and the Pacific.

The following is a very imperfect account of the British Indian *Cinnamoma*, to discriminate the species of which with any approach to completeness or accuracy requires a careful study of living specimens. I am so uncertain of the limits of the described species and their synonymy, that I have sparingly quoted from such authors as Miquel and Nees, who must often have worked upon very incomplete materials; and from referring to extra-Indian species, which may or may not be identical with Indian. Meissner did much towards reforming the genus, but more remains to be done. I have retained a good many species that I suspect will not stand. In the "Genera Plantarum" it is suggested that the genus may be reduced to ten species, but I do not see my way to this. The fruiting perianth is incorrectly described in that work; it is usually greatly enlarged, and the lobes sometimes persist.

Sect. I. **Malabathrum.** *Buds* naked or with very small scales. *Leaves* opposite, triple-nerved, rarely alternate or penninerved; axils of principal nerves without pits.

* Leaves opposite or subopposite, triple-nerved.

a. Species of the Himalaya and Northern India.

1. **C. Tamala,** *Fr. Nees in Nees & Eberm. Med. Pharm. Bot.* ii. 426, and *Plant. Officin. fasc.* 4; leaves 3–10 in. ovate oblong or lanceolate usually acuminate 3-nerved, nerves not impressed above, panicles scarcely exceeding the leaves, perianth sparingly silky-pubescent, lobes deciduous in fruit, stamens and ovary villous, fruit small ellipsoid. *Meissn. in DC. Prodr.* xv. 1. 17; *Hayne, Arnz. Gew.* xii. t. 26; *Blume Rumph.* t. 14, f. 3, 4; *Nees in Wall. Pl. As. Rar.* ii. 75, and *Syst. Laurin.* 56; *Brand. For. Fl.* 374; *Gamble Man. Ind. Timb.* 306. C. albiflorum, *Nees in Wall. Pl. As. Rar.* ii. 75, and iii. 32, and in *Syst. Laurin.* 58; *Wight Ic.* t. 140; *Blume Rumph.* t. 14, f. 2? C. Cassia, *Don Prodr.* 67 (*not of Linn.*). C. pauciflorum, *var.* ? β. Tazia, *Meissn. in DC. Prodr.* xv. 1. 17. Persea Tamala, *Spreng. Syst.* ii. 268. Laurus Cassia, *Roxb. Hort. Beng.* 30; *Wall. Cat.* 2580. L. albiflora, *Wall. Cat.* 2569. L. Tamala, Tazia, Somcaurium & Sailyana, *Ham. in Trans. Linn. Soc.* xiii. 555–558.

TROPICAL and SUBTROPICAL HIMALAYA; from near the Indus to Bhotan, alt. 3–5000 ft., ascending to 7800 in Sikkim. SILHET and KHASIA MTS., alt. 3–4000 ft.

A moderate-sized tree. *Leaves* usually 4–5 in. long, very variable in breadth, rarely alternate, shining above, rarely elliptical and obtuse, venules below very obscure, more distinct in Sikkim specimens; a single specimen from the Deyra doon (Falconer) has broader (2½ in.) leaves with 5 nerves. *Flowers* ⅙–⅕ in. long. *Fruit* ½ in. long; peduncle and calyx small, ½ in. long, the latter usually ¼ in. diam. with truncate lobes.—Khasian specimens from the Bor-panee River have leaves only ½–1 in. diam. Brandis is the authority for this species advancing westward to near the Indus; Garwhal is the most western locality known to me. Meissner's three varieties have no distinctive characters.

2. **C. obtusifolium,** *Nees in Wall. Pl. As. Rar.* ii. 73, and *Syst.*

Laur. 33; leaves quite glabrous 8–12 in. very coriaceous elliptic-oblong obtuse acute or acuminate 3-nerved, nerves not impressed above, panicles very large and stout subterminal and corymbiform often exceeding the leaves, perianth subsilky-pubescent, lobes persistent in fruit, stamens and ovary sparsely hairy or glabrous, fruit small ellipsoid or subglobose. *Meissn. in DC. Prodr.* xv. 1. 12; *Wight Ic.* t. 139; *Kurz For. Fl.* ii. 287; *Gamble Man. Ind. Timb.* 305. Laurus obtusifolia, *Roxb. Fl. Ind.* ii. 302; *Wall. Cat.* 2574. L. macrophylla, *Wall. Cat.* 2575. L. Bejolghota and L. Bazania, *Ham. in Trans. Linn. Soc.* xiii. 559, 560. L. Cassia, *Herb. Ham.*

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton*, &c.; Sikkim, ascending to 7000 ft. ASSAM, SILHET and the KHASIA MTS., and southwards to TENASSERIM and the ANDAMAN ISLANDS.

A large robust plant, the largest leaved of the Indian species. *Leaves* often glaucous beneath, nervules faint or distinct; petiole short, robust. *Flowers* small (¼ in diam.), often crowded at the ends of the much-branched long-peduncled crowded panicles. *Fruit* ⅓–½ in. long, succulent; peduncle and calyx ⅓–½ in. long, the latter ⅓ in. broad in fruit, lobes rounded in Sikkim specimens, narrower and more acute in Silhet ones.

3. **C. impressinervium**, *Meissn. in DC. Prodr.* xv. 1. 21; leaves quite glabrous 3–5 in. elliptic-lanceolate acuminate 3-nerved, nerves deeply impressed in age, panicles shorter than the leaves silkily tomentose, fruiting calyx small pyriform or cupular, enclosing the small unripe fruit, lobes wholly deciduous.

SIKKIM HIMALAYA, alt. 4–6000 ft., *Herb. Griffith, J. D. H.*—DISTRIB. Yunan.

Branches slender; buds and young shoots silky. *Leaves* brown when dry, 1–2 in. diam., shining above, paler beneath, with faint reticulations; petiole very slender. *Panicles* shortly peduncled, rather few-fld. *Fruiting* calyx and pedicels ¼ in.; mouth quite entire; the fruit is too young to determine its nature.

4. **C. pauciflorum**, *Nees in Wall. Pl. As. Rar.* ii. 75, and *Syst. Laur.* 68; leaves quite glabrous 2–4 in. ovate or ovate-lanceolate acuminate 3-nerved, base acute rounded or cordate, panicles shorter than the leaves few-fld. nearly glabrous, calyx-lobes wholly deciduous in fruit. *Meissn. in DC. Prodr.* xv. 1. 17, *excl. var. β.*; *Gamble Man. Ind. Timb.* 305; *Wall. Cat.* 2579. C. recurvatum, *Wight Ic.* t. 133. Laurus recurvata, *Roxb. Fl. Ind.* ii. 301.

KHASIA MTS.; alt. 4000 ft., *De Silva, J. D. H. & T. T.* ASSAM VALLEY and SILHET, *Gamble.*

A small tree, buds and young shoots glabrous. *Leaves* very much smaller than in the preceding species, firmly coriaceous, usually glaucous and finely reticulated beneath, rarely 5-nerved, tip sometimes caudate-acuminate. *Panicles* sometimes reduced to 3 flowers. *Perianth* ⅒–⅛ in. long. *Stamens* hairy. *Fruiting calyx* very small, with a quite entire mouth; fruit too young to describe.—Hamilton's *C. Tazia*, referred doubtfully to this as a variety, is clearly *C. Tamala*, as the specimen in Herb. Wallich proves, and it was moreover found at the foot of the Sikkim Himalaya, where *C. pauciflorum* does not occur. Roxburgh states that his *L. recurvata* was supposed to have come from China, and if so, it may be the *C. dulce* of the Hong Kong Flora, and possibly the same species as *C. pauciflorum.* Roxburgh describes his *L. dulcis* from China as having long narrow leaves with the lateral nerves vanishing a little above the middle, and must be a very different plant. The drawing of Roxburgh which Wight has copied (lc. t. 138) is unnamed in the original. Another drawing of Roxburgh's named *L. dulcis* equally disagrees with the description in "Flora Indica" in having strong lateral nerves produced to the tip. Wallich doubtfully refers Roxburgh's *L. recurvata* to *Daphnidium.*

b. Species of Burma and the Malay Peninsula. (See also *C. zeylanicum & obtusifolium.*)

5. **C. javanicum,** *Blume Bijd.* 570, and *Rumph.* 42, t. 19; branches petioles young leaves beneath and panicles fulvous-tomentose at length glabrate, leaves 6–12 in. elliptic or elliptic-oblong acuminate strongly 3-nerved transverse nerves very strong beneath, panicle shorter than the leaves few-fld. *Meissn. in DC. Prodr.* xv. 1. 10.

SINGAPORE, at Madaug, *Cantley.* ? Penang, *Walker.*—DISTRIB. Java, Sumatra, Borneo.

Branches robust, *Leaves* firmly coriaceous, shining above; petiole stout. *Panicles* 3–4 in. long, perianth densely tomentose. *Fruit* unknown.—The Singapore specimens in late flower are certainly the Javan plant, but the Penang ones, which have neither flower nor fruit, have the leaves more narrowed into the very short thick petiole.

6. **C. Cassia,** *Blume Bijd.* 570 ?; leaves 3–4 in. glabrous oblong to oblong-lanceolate caudate-acuminate 3-nerved, petiole slender, panicles cymose silky terminal and axillary, flowers small, fruit the size of a pea with the perianth-lobes persistent or truncate.

AVA; on the Kakhyen Hills, *Kurz.*—DISTRIB. China.

I have refrained from quoting synonyms for Kurz's plant, of which I have seen no specimens; it is remarkable for the small size of the fruit, in which respect it agrees with the plant that yields the Cassia bark of China, but differs in the perianth-lobes being sometimes persistent, these being wholly deciduous in the China plant, leaving a perfectly entire mouth of the fruiting perianth. In Bentley and Trimen's Med. Pl. (iii. t. 233) they are represented as minute and persistent.

7. **C. iners,** *Reinw. in Blume Bijd.* 570; leaves glabrous 3–8 in. lanceolate oblong or linear-oblong 3-nerved, base acute or obtuse, panicles slender long-peduncled often exceeding the leaves silkily pubescent, flowers small, perianth $\frac{1}{10}$ in. long lobes persistent, fruit oblong $\frac{1}{3}$ in. long base sunk in the perianth. *Meissn. in DC. Prodr.* xv. 1. 19 (*excl. var.* γ.); *Nees in Wall. Pl. As. Rar.* ii. 73; *Wight Ic.* t. 122; ? *Kurz For. Fl.* ii. 287. C. malabathrum, *Batka in Nov. Act. Nat. Cur.* xvii. 2. 618, t. 45; *Nees Syst. Laur.* 38, 663. C. Griffithii, *Meissn. l. c.* 19. C. gracile, *Miquel Ann. Mus. Bot. Lugd. Bat.* i. 259. Laurus malabathrum, *Wall. Cat.* 2583 A *in part* (*not of Roxb.*). L. nitida, *Roxb. Fl. Ind.* iii. 300; *Wall. Cat.* 2582, *excl.* B.

TENASSERIM, *Kurz*; at Mergui, *Griffith.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1242, 1243). PENANG, *Wallich, Phillips.*—DISTRIB. Sumatra, Java.

A tree, branchlets nearly glabrous. *Leaves* very variable in breadth, rarely ovate and rounded at the base, shining above, nerves continued to the tip. *Panicles* very lax-fld., with spreading branches and pedicels; flowers about $\frac{1}{10}$ in. long. *Fruiting perianth* rather spreading when dry, $\frac{1}{3}$ in. diam.—Kurz describes the fruiting perianth as truncately 6-lobed, implying that the lobes are partially deciduous, and the fruit as $\frac{2}{3}$ in. long, which makes me doubt the identity of his plant with that described above. Wallich's *L. malabathrum* is, I think, this, and is not Roxburgh's, who takes the name, following Solander, for Rheede's Malabar plant. There is in the Kew Herbarium a Canara specimen of what resembles this, but it is not in fruit.

8. ? **C. nitidum,** *Blume Rumph.* i. 35, t. 13, f. 2, and t. 16, f. 1, 2; leaves 3–9 in. glabrous elliptic oblong or linear-oblong obtuse 3-nerved, panicles slender long-peduncled often longer than the leaves silkily pubescent, perianth $\frac{1}{8}$ in. long lobes rounded and persistent in fruit. C. iners, γ. subvenosum, *in part*, *Meissn. in DC. Prodr.* xv. 1. 21. C. eucalyptoides, *F. Nees Pl. Off. Suppl. fasc.* iv. t. 9; *Nees Syst. Laur.* 41. C. iners, *Wall. Cat.* 2583 E, and in *Wall. Pl. As. Rar.* ii. 73. ? L. Culitlaban, *Roxb. Fl. Ind.* ii. 299; *Wight Ic.* t. 137; *Wall. Cat.* 2583 C. Laurus malabathrum, *L.* ?, *Wall. Cat.* 2583 *in part* (*not of Roxb.*).

TENASSERIM; at Mergui, *Griffith*. PENANG and BURMA, *Wallich*. CANARA?, *Herb. Stocks & Dalzell.*—DISTRIB. Malay Islands and Moluccas.

Very like *C. iners*, and perhaps only a variety, but the flowers are longer and almost twice as large.—Roxburgh's *L. Culitlaban*, for which he cites Willdenow, and which he identifies with Rumph. Amb. ii. t. 14, is from Amboyna, and described as a slender Cypress-like tree with short appressed branches, and panicles stouter than the leaves; his figure (Wight Ic. t. 137) represents the leaves as much more acute than in the specimen in Herb. Wallich.

9. **C. Tavoyanum,** *Meissn. in DC. Prodr.* xv. 1. 20; branchlets young leaves beneath and panicles tomentosely pubescent, leaves 4–6 in. elliptic- or oblong-lanceolate obtusely acuminate 3-nerved, panicles slender long-peduncled few-fld., flowers long-pedicelled ⅛ in. long. C. sulphuratum, *Kurz For. Fl.* ii. 288, *not of Nees*. C. sulphuratum γ merguense, *Meissn. l. c.* 18. C. lucens, *Miquel Ann. Mus. Bot. Lugd. Bat.* i. 261. C. obtusifolium, var., *Wall. Cat.* 2569 G.

TENASSERIM; at Tavoy, *Gomez*; Mergui, *Griffith* (*Kew Distrib.* 4241), *Helfer* (*Kew Distrib.* 4245, *C. iners?*); Moulmein, *Parish.*

This again is very near *C. iners*, from which the copious fulvous tomentum, narrower leaves, usually slender and longer petiole, longer pedicels and larger flowers distinguish it. It is also very near if not identical with *C. sulphuratum*, but in the absence of fruit I do not venture to unite it.

10. **C. vimineum,** *Nees Syst. Laur.* 82, and in *Wall. Pl. As. Rar.* ii. 76; quite glabrous, branches very slender, leaves 3–4 in. subopposite lanceolate obtuse 3-nerved shining above, margins waved. *Meissn. in DC. Prodr.* xv. 1. 19. Laurus viminea, *Wall. Cat.* 2578.

PENANG; *Porter.*

The slender habit and small shining leaves with waved margins distinguish this species. There are no flowers in Wallich's specimens, and two flowers distributed with it to Herb. Hook. are detached, and perhaps do not belong to the leaf-bearing ones; they are very small and nearly glabrous.—Kurz informs me that boiled leaves smell of fennel.

11. **C. mollissimum,** *Hook. f.*; branches petioles and leaves beneath densely villous with soft white hairs, leaves elliptic acuminate 3-nerved, peduncles very slender strict few-fld. shorter than the leaves, flowers minute shortly pedicelled.

PENANG; *Curtis.*

Branches slender, but thickened by the long soft spreading hairs. *Leaves* 5–6 in., pale greyish white beneath when dry, above pale green and finely softly hairy, at length glabrate; nerves strong beneath, reaching the tip; petiole stout, ⅛–½ in. *Peduncle* 2 in., trichotomously branched at the tip only. *Flowers* 1/12 in. long, tomentose, pedicels hardly as long. *Perianth-lobes* short, rounded.—A very remarkable and singularly fragrant species.

c. Species of the Deccan Peninsula and Ceylon. (See *C. iners & nitidum* in b.)

12. **C. zeylanicum,** *Breyn in Ephem. Nat. Cur. dec.* i. *ann.* 4, 139; leaves 4–7 in. glabrous very coriaceous ovate or ovate-lanceolate 3–5-nerved obtuse or subacute reticulate beneath, panicle often longer than the leaves subsilkily pubescent, perianth ¼ in. long, fruiting peduncle campanulate ⅓ in. diam. crowned with the rounded perianth-lobes, fruit oblong ⅜ in. long apiculate dry. *Nees Syst. Laurin.* 95, and in *Wall. Pl. As. Rar.* ii. 74, and iii. 32; *Meissn. in DC. Prodr.* xv. 1. 13; *Blume Bijd.* 588; *Wight Ic.*

t. 123, 129, 134; *Wall. Cat.* 2578; *Beddome For. Fl.* t. 262, and *For. Man.* 184, and *Flor. Sylv.* t. 242; *Bentl. & Trim. Med. Pl.* iii. t. 224; *Thwaites Enum.* 252 (*excl. some vars.*); *Kurz For. Fl.* ii. 287; *Miquel Fl. Ind. Bat.* i. 898. C. aromaticum, *Grah. Cat. Bomb. Pl.* 173; *Dalz. & Gibs. Bomb. Fl. Suppl.* 71. ? C. iners, *Wight Ic.* t. 122 *bis.* Laurus cinnamomum, *Roxb. Fl. Ind.* ii. 295. L. nitida, *Wall. Cat.* 2582 ? B. L. Cassia, *Burm. Fl. Ind.* 91; *Ham. in Trans. Linn. Soc.* xiii. 555; *Spreng. Syst.* ii. 567; *Bot. Mag.* t. 1636, *copied in Wight Ic.* t. 128.

TENASSERIM, BURMA and the MALAY PENINSULA; DECCAN PENINSULA and CEYLON, indigenous or cultivated.—DISTRIB. Cultivated in the Malay Islands and elsewhere in the tropics.

I am unable to unravel the synonymy of the varieties attributed to this species by Nees and others. Thwaites suspects that it passes into *C. nitidum* and *iners.* This is possible if the fruiting calyces prove the same, though not into *C. obtusifolium*, which, besides its characters of leaf and panicle, appears to have a different range. I have also kept *C. multiflorum* and *ovalifolium* (which Thwaites unites with *zeylanicum*) as distinct, though with hesitation. Kurz (For. Fl.) describes the fruiting perianth of *zeylanicum* as truncately 5-cleft, but I find the lobes in fruit all perfect and rounded in what I take to be typical specimens. Meissner's var. *fœniculaceum* (Ceylon, Thwaites 2284) seems to have no recognizable character, and Thwaites does not distinguish it. Vars. *inodorum* and *Cassia* of Nees I suppose to be the same thing, and are the faintly aromatic wild forms, passing probably into *nitidum*, the fruiting perianth of which is unknown. Beddome's figure of *zeylanicum* is of a very coarse-leaved var. from the Nilghiris, which he calls Var. *Wightii*; his fig. 11 on the same plate representing what he supposes to be fruit of *iners* is perhaps referable to *C. macrocarpum.*

13. **C. multiflorum,** *Wight Ic.* t. 126 and 131; branches slender, branchlets and young leaves beneath clothed with fine white pubescence, leaves opposite 2–4 in. thinly coriaceous usually ovate-lanceolate acuminate 3-nerved, panicles slender much branched many-fld., flowers small subcorymbose, pedicels slender, perianth ⅛ in. long. *Meissn. in DC. Prodr.* xv. 1. 15. C. zeylanicum, var. β., *Thwaites Enum.* 252. C. villosum & dubium, *Wight Ic.* t. 127, 135. C. perpetuo-florens, *Burm. Fl. Zeyl.* 63; *Wight Ic.* t. 141. C. iners, var. δ. ? dubium, *Meissn. l. c.* 20. Laurus dubia, *Wall. Cat.* 2571.

CEYLON; common in the Central Province, ascending to 3000 ft.

This, which Thwaites finds it difficult to distinguish from *zeylanicum*, is a more slender plant, with much smaller and less coriaceous leaves, and very much smaller flowers. Wallich's *L. dubia* received from Wight as *L. Cassia* seems the same thing, and probably came from Ceylon.

14. **C. sulphuratum,** *Nees in Wall. Pl. As. Rar.* ii. 74, and *Syst. Laur.* 55; branches petioles young leaves beneath or on both surfaces and panicles densely fulvous-tomentose, leaves thickly coriaceous elliptic oblong or ovate-lanceolate obtuse or acute 3–5-nerved, panicles shorter than the leaves long-peduncled, flowers few corymbose, perianth ¼ in. long lobes persistent, fruit ½–⅔ in. ellipsoid fleshy. *Meissn. in DC. Prodr.* xv. 1. 18 (*excl. vars.* and *syn. villosum*). Laurus malabathrum, *Wall. Cat.* 2583 D.

NILGHIRI HILLS, *Heyne*, &c.

Leaves very variable in breadth, base acute, nerves very strong and often pubescent on the upper surface, old perfectly glabrous and very rigidly coriaceous, in mountain ? specimens often short broad and convex with recurved margins; petiole usually short, ¼ in., and stout. *Panicles* stout, 2–4 in. *Fruiting perianth* ⅓ in. diam., lobes rounded. *Fruit* minutely apiculate.—Very closely allied to *C. Tavoyanum*, if not conspecific.

15. **C. Wightii,** *Meissn. in DC. Prodr.* xv. 1. 11; branches and

petioles very robust, terminal buds globose silky, leaves subopposite 3–4 in. thickly coriaceous elliptic broadly ovate or oblong obtuse glaucous beneath, nerves 3–5 continued to near the tip, panicles fulvous-tomentose usually longer than the leaves, peduncle branches and pedicels very stout few- or many-fld., perianth ¼ in. lobes deciduous, fruit globose seated on the very thick obconic base of the perianth. C. Bazania, *var.* parvifolia, *Nees in Wall. Pl. As. Rar.* iii. 32, and *Syst. Laurin.* 36.

NILGHIRI HILLS, *Wight, Perrottet*, &c.; Dindygul, *Wight*.

Branches as thick as a goose-quill, apparently soft, shrinking and black when dry, young nearly glabrous. *Leaves* sometimes almost rounded, finely reticulated beneath, base acute; petiole ⅓–½ in., often very broad. *Panicles* long-peduncled; pedicels shorter than the perianth. *Fruit* ⅜ in. diam.; base of perianth about ⅓ in. diam., obconic, fleshy.—Apparently a very distinct species, but I am not certain that the fruit is normal, it has a diseased look.

16. **C. ovalifolium**, *Wight Ic.* t. 125; branches and petioles very robust, terminal buds very small, leaves subopposite 3–4 in. thickly coriaceous elliptic orbicular or sublanceolate tip rounded or obtuse, nerves 3 vanishing beyond the middle, panicles hoary usually shorter than the leaves long-peduncled few-fld. *Meissn. in DC. Prodr.* xv. 1. 22. C. zeylanicum, *var.* ovalifolium, *Thwaites Enum.* 252.

CEYLON; in the Central Province, alt. 4–8000 ft.

Very young branchlets and leaves silky. *Leaves* rarely 5 in. long and elliptic-lanceolate, pale and finely reticulated beneath, with 3 faint or distinct nerves, base sometimes cordate; petiole usually short and very stout, but sometimes ½ in. *Panicles* solitary or 2–3-nate, often only 3-fld. *Perianth* about ⅙ in. long.—Thwaites, from a note on his specimens made subsequently to the publication of his Enumeratio, was disposed to regard this as distinct from *zeylanicum*. The evanescence of the three nerves beyond the middle of the leaf is a very constant but not an absolute character.

17. **C. litseæfolium**, *Thwaites Enum.* 253; glabrous or nearly so, leaves subopposite 3–5 in. thickly coriaceous ovate or oblong tip obtuse or rounded, nerves 3–5 very indistinct rarely produced to the middle, petiole slender, panicles subterminal longer than the leaves branched laxly many-fld., perianth small campanulate silky, lobes early caducous. *Meissn. in DC. Prodr.* xv. 1. 22.

CEYLON; Central Province, at Hapotelle, alt. 5000 ft.; *Thwaites*.

A tree, 50–60 ft. high, branched at the top; branchlets and small terminal buds subsilky. *Leaves* hard, flat, pale brown; nerves almost immersed in the substance; base acute; petiole ⅓–⅔ in. *Panicles* on long stout peduncles; flowers subcorymbose at the ends of the branches; pedicels longer than the perianth, stout. *Perianth* about $\frac{1}{10}$ in. long.

18. **C. macrocarpum**, *Hook. f.*; branches slender, leaves 5–8 in oblong-lanceolate 3–5-nerved, petiole ¾–1 in., fruiting perianth ⅔ in. diam broadly funnel-shaped very shortly 6-toothed, fruit 1 in. long globosely oblong. C. iners, *Wight Ic.* t. 130. Carua, *Ham. in Trans. Linn. Soc.* i. 57 —*Rheede Hort. Mal.* i. t. 51.

CANARA, *Dalzell*.

Leaves 1½–3 in. broad, rather thinly coriaceous, very faintly reticulate beneath lateral nerves sometimes ⅔ in. above the base; petiole ¾–1 in. *Panicles* shorter than the leaves; fruiting peduncle long, slender for the size of the fruit, which is much the largest of the genus. *Fruiting perianth* apparently fleshy, together with the thickened pedicel nearly 1 in. long.

19. **C. gracile**, *Hook. f.*; quite glabrous, branches slender, leave

opposite 3–4 in. thinly coriaceous elliptic ovate or lanceolate obtusely acuminate 3-nerved finely reticulate on both surfaces, panicles axillary very slender shorter than the leaves few-fld., pedicels very long and slender, flowers very small.

SOUTH DECCAN; Tinnevelly Hills, alt. 3–4500 ft., *Beddome.*

A shrub or tree; branches usually pale. *Leaves* ¾–1¼ in. broad, pale green, subcaudate, glaucous or not beneath, base acute, nerves not produced to the tip; petiole slender, ¼–½ in. *Panicles* 6–8 fld.; pedicels ¼–⅜ in. long; flowers 1/10 in., glaucous, quite glabrous, as are the stamens and ovary.—Apparently a very distinct and pretty little species, but more specimens are wanted.

** Leaves mostly alternate, triple-nerved.

20. **C. caudatum,** *Nees in Wall. Pl. As. Rar.* ii. 76, and *Syst. Laurin.* 83; leaves alternate 3–4 in. thinly coriaceous orbicular or elliptic obtusely caudate-acuminate 3–5-nerved, flowers minute in very short axillary few-fld. pubescent cymes, fruiting perianth turbinately funnel-shaped fleshy 6-lobed, fruit ellipsoid or globose fleshy. *Meissn. in DC. Prodr.* xv. 1. 23; *Kurz For. Fl.* ii. 289. Laurus caudata, *Wall. Cat.* 2603.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 1–4000 ft., *J. D. H. & T. T.*, &c. BURMA, in the Kakhyen Hills, *Kurz.*—DISTRIB. Yunan.

A large glabrous shrub with slender spreading branches. *Leaves* rarely opposite, brown when dry, sometimes oblique, base acute, nervules transverse, very slender; petiole slender, ⅓ in. *Cymes* irregular, sometimes reduced to one or two axillary flowers; flowers 1/12 in. diam.; pedicels slender. *Fruiting perianth* ⅓–½ in. diam., very fleshy. *Fruit* rarely obovoid.

21. **C. Perrottetii,** *Meissn. in DC. Prodr.* xv. 1. 22; densely fulvous-tomentose on branches and both surfaces of young leaves and panicles, leaves mostly alternate long-petioled oblong or ovate-oblong 3-nerved tip obtuse or rounded, panicles shorter or longer than the leaves stout few-fld., flowers large subsessile.

NILGHIRI HILLS, *Perrottet, Wight.*

A shrub? branches stout. *Leaves* thickly coriaceous, in age glabrous on both surfaces and shining above, base acute; petiole ¾–1½ in. *Flowers* 3-nate, ¼ in. long, sessile or narrowed into a very short stout pedicel, densely tomentose. *Fruit* not seen.

*** Leaves subopposite, penninerved.

22. **C. citriodorum,** *Thwaites Enum.* 253; leaves 2–3 in. subopposite quite glabrous densely coriaceous ovate or oblong obtuse penninerved, nerves very faint, panicles longer than the leaves stout branched laxly many-fld. subsilky, flowers stoutly pedicelled. *Meissn. in DC. Prodr.* xv. 1. 22.

CEYLON; Saffragam and near Galagama, alt. 1–2000 ft., *Thwaites.*

A tree, 20–30 ft.; branches stout. *Leaves* very hard, pale brown and shining when dry, base rounded or acute, nerves spreading from the very obscure midrid; petiole ⅓–½ in. *Flowers* about ¼ in. long, pedicels about as long.—I have seen no fruit. Meissner describes the calyx-lobes as deciduous, the fruiting calyx as truncate and quite entire, 2 lines in diameter, and the fruit as ovoid.

Sect. II. **Camphora.** *Buds* enclosed in large orbicular concave silky caducous imbricating scales. *Leaves* alternate, penninerved; axils of principal nerves often pitted. *Perianth-lobes* wholly caducous in age.

The Camphor tree, *C. camphora*, F. Nees (*Wall. Cat.* 6347), belongs to this section; it is commonly cultivated in India.

23. **C. glanduliferum,** *Meissn. in DC. Prodr.* xv. 1. 25 (*excl. var. β.*); leaves 3–5 in. alternate elliptic or lanceolate caudate-acuminate penninerved, panicles axillary long-peduncled few-fld. nearly glabrous, flowers sparsely pubescent without villous within. Camphora glandulifera, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 90. Laurus glandulifera, *Wall. in Act. Ser. Med. & Phys. Calcutt.* i. 45, *with plate*, and *Cat.* 2601; *Brandis For. Flor.* 376; *Gamble Man. Ind. Timb.* 306.

CENTRAL HIMALAYA; Nepal, top of Sheopore, *Wallich*; ? Kumaon, at Petora, alt. 5000 ft., *Thomson*. KHASIA MTS.; Myrung, alt. 5–6000 ft., *J. D. H. & T. T.*

A tree; branches stout, smooth, black when dry. *Leaves* very variable in size and breadth, thickly coriaceous, often glaucous beneath, brown when dry; nerves erecto-patent; petiole ½–1 in., slender. *Panicles* 2 in. long, peduncle very slender glabrous; flowers shortly pedicelled, $\frac{1}{10}$ in. diam. *Stamens* hairy. *Ovary* glabrous.—I have described this species from Wallich's Nepal plants with nearly glabrous panicles, referring the tomentose flowered var. *β. caniflora* of Meissner to *C. cecicodaphne*. Brandis and Gamble no doubt include it under their *glanduliferum*. If the fruit which is unknown be not different, I do not see how Wallich's plant is to be distinguished from *C. Parthenoxylon*.

24. **C. cecicodaphne,** *Meissn. in DC. Prodr.* xv. 1. 25; habit and characters of *C. glanduliferum*, but panicles shorter crowded and densely tomentose as are the flowers within and without, fruit 1¼ in. long oblong. C. glanduliferum, *β.* caniflorum, *Meissn. l. c.* Camphora caniflora, *Meissn. mss.* Cecicodaphne glaucescens, *Nees in Wall. Pl. As. Rar.* ii. 70, and *Syst. Laurin.* 203. Tetranthera glaucescens, *Wall. Cat.* 2560. Laurus glaucescens; *Herb. Ham.*

EASTERN HIMALAYA; Sikkim, *J. D. H.*; Bhotan, *Griffith*. ASSAM, *Mann*; Patkoye Mts., *Griffith* (*Kew Distrib.* 4247). SILHET, *Hamilton*, &c.

As stated under *C. glanduliferum*, this may prove a form of that plant, as Meissner supposed; it differs from *C. Parthenoxylon* in the tomentose panicles and large oblong fruit.

25. **C. inunctum,** *Meissn. in DC. Prodr.* xv. 1. 25; leaves alternate 3–5 in. long-petioled elliptic-oblong or ovate obtusely acuminate penninerved, nerves very faint finely reticulate beneath, panicles solitary slender glabrous few-fld., flowers long-pedicelled glabrous. *Kurz For. Fl.* ii. 289. Camphora inuncta, *Nees in Wall. Pl. As. Rar.* iii. 32, and *Syst. Laurin.* 89; *Miquel Fl. Ind. Bat.* i. pt. 1, 905. Tetranthera camphoracea, *Wall. mss.* Phœbe micrantha, *Meissn. mss.*

TAVOY, *Gomez, Herb. Calcutt.* MALACCA, *Griffith* (*Kew Distrib.* 4256).

A tree with slender branches which are black when dry. *Leaves* in Wallich's specimens 3 in., in King's 5 in., thinly coriaceous, with two long sub-basal nerves; petiole ½–1 in. *Panicle* slender, 2–3 in. long, long-peduncled, subcorymbosely few-fld.; flowers $\frac{1}{10}$ in. broad, on slender pedicels ⅙–¼ in. "Fruiting perianth funnel-shaped. *Berry* ovoid the size of a pea," *Meissner*.—Wallich's specimens are very imperfect, and the fruit described by Nees is not on it. I suspect *C. inodorum*, Meissn., of Borneo, may be the same plant, and both may possibly be referable to *C. Parthenoxylon*.

26. **C. Parthenoxylon,** *Meissn. in DC. Prodr.* xv. 1. 26; leaves alternate elliptic ovate or oblong subcaudate-acuminate penninerved often glaucous beneath, panicles short nearly glabrous shorter than the leaves, perianth nearly glabrous without pubescent within, fruit ⅓ in. diam. globose *Kurz For. Fl.* ii. 289; *Benth. Fl. Hongk.* 290. C. pseudo-sassafras, *Meissn l. c.* 27. C. ? malaccense, *Meissn. l. c.* 27. C. Neesianum, *Meissn. l. c.* Camphora Parthenoxylon, *Nees in Wall. Pl. As. Rar.* ii. 76. C. pseudo-sassafras, *Miquel in Zolling. Verzeichn.* 113, 114 *in part.* C. chinensis

Nees in Otto Gartenzeit. 1833, 91, and *Syst. Laurin.* 92. Sassafras Parthenoxylon, *Nees Syst. Laurin.* 491; *Wight Ic.* t. 1832. Parthenoxylon porrectum and P. pseudo-sassafras, *Blume Mus. Bot. Lugd. Bat.* i. 323; *Miquel Fl. Ind. Bat.* i. 1. 917. Persea pseudo-sassafras, *Zolling. in Nat. en Geneesk. Arch.* ii. 633. Laurus Parthenoxylon, *Jack in Mal. Misc.* i. 28; *Wall. Cat.* 2602. L. porrecta, *Roxb. Hort. Calc.* 30, and *Fl. Ind.* ii. 308. Phœbe latifolia, *Champ. in Kew Journ. Bot.* v. 197.

MALAY PENINSULA; from Tenasserim, *Griffith*, &c. (*Kew Distrib.* 4248, 4249), to PENANG, *Wallich, Maingay* (*Kew Distrib.* 1514 and 1244).—DISTRIB. Sumatra, Java, China.

A large tree, branches stout, black when dry, with very smooth bark. *Leaves* extremely variable, the largest 8 by 4 in., coriaceous, others thinner almost membranous and glaucous beneath, base acute; nerves spreading, the lowest pair sometimes longest; petiole slender, 1–1½ in. *Panicles* 1–3 in. long, with the young shoots enclosed in rounded coriaceous silky caducous scales, black when dry, many-fld.; flowers $\frac{1}{12}$ in. diam., pedicelled. *Perianth-lobes* broadly oblong, obtuse, wholly deciduous. *Stamens* very short, hairy. *Ovary* glabrous. *Stigma* discoid. *Fruiting perianth* ¼–⅓ in. long, funnel-shaped, suddenly expanding into the fruit-bearing disk. *Fruit* succulent.—I find no specimen of *C. malaccense*, Meissn., said to be described from specimens in Herb. Hook.; but I cannot doubt its being *C. Parthenoxylon.*

DOUBTFUL AND EXCLUDED SPECIES.

C. BURMANNI, *Blume* (Laurus dulcis, *Roxb. Hort. Beng.* 30, and *Fl. Ind.* ii. 303; *Wall. Cat.* 2581), is a Malayan Island species, not hitherto found in India. Meissner quotes Wight's Icones, t. 138, copied from a drawing of Roxburgh under the name of *dulce*, for this, but it differs in the very strong nerves produced to the very tips of the leaves.

C. CATHIA, *Don Prodr.* 67, is probably *Phœbe paniculata.*

C. HEYNEANUM, *Nees Syst. Laur.* 77 (Laurus Heyneana, *Wall. Cat.* 2576), is referred to var. *γ. subvenosum* of *C. iners*, Reinw., by Meissner (in *DC. Prodr.* xv. 1. 20). It is not very like any species described above; it is a very slender plant, the subopposite leaves are very long and narrow, 5–7 by ¼–1 in., with nerves obscure above; the fruiting peduncles are very long and slender; the pedicels ⅓ in., suddenly dilating into the almost rotate fruiting-perianth ½ in. diam. with rounded spreading lobes, and the fruit (apparently dry) is oblong ½ in. long.—It is from Heyne's Herbarium without habitat.

LAURUS MALABATHRICA, *Soland. mss. in Roxb. Fl. Ind.* ii. 297. Roxburgh quotes Rheede's Katou-Karua (*Hort. Mal.* v. t. 53) for this; and Hamilton (in *Trans. Linn. Soc.* xiii. 550) has a long article upon it and upon Rheede's Carua (*Hort. Mal.* i. t. 57), which I have referred to *C. macrocarpum.* It appears to me to be impossible to identify absolutely the plants which such figures are supposed to represent.

LAURUS RIGIDA, *Wall. Cat.* 2570, from Silhet, with rigid elliptic very coriaceous leaves 3–5 in. long, is indeterminable.

C. TOMENTOSUM, *Don Prodr.* 67, is probably *Phœbe paniculata.*

LAURUS ? ? SMILACIFOLIA, *Wall. Cat.* 2572, from Penang, is *Grewia laurifolia*, with leaves 10 in. long.

8. MACHILUS,* *Nees.*

Evergreen trees. *Leaves* alternate, penninerved. *Flowers* 2-sexual, in axillary panicles. *Perianth-tube* short or 0; segments 6, subequal or outer rather smaller, all persistent (except *M. edulis*) and spreading or reflexed in fruit. *Perfect stamens* 9, filaments of the 1st and 2nd series eglandular. with introrse 4-celled anthers; of the 3rd series eglandular with extrorse 4-celled anthers; staminodes of the 4th series cordate. *Berry* globose or oblong, seated on the persistent perianth.—Species about 15, Eastern Asiatic.

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* Further information on this genus will appear at the end of the volume, additional materials being expected from Calcutta.

A. Species of Northern India, Himalaya, Assam and the Khasia Mts.

* *Flowers quite or nearly glabrous.* (See also *M. odoratissima.*)

1. **M. parviflora,** *Meissn. in DC. Prodr.* xv. 1. 505; quite glabrous, leaves linear-oblong or oblanceolate obtuse subacute or obtusely acuminate glaucous beneath minutely reticulate on both surfaces, panicles shorter than the leaves few-fld., perianth subglobose ⅛ in. diam. glabrous, lobes broad short, pedicels about twice as long stout, fruit ¾–1 in. long elliptic-oblong.

KHASIA MTS., alt. 4–5000 ft., *Griffith* (*Kew Distrib.* 4263), *J. D. H. & T. T.*

A small tree; bark of flowering branches whitish, rough. *Leaves* very variable in breadth, youngest faintly silky, firmly coriaceous, base acute; nerves 8–12 pair; petiole ⅓–¾ in. *Panicles* narrow, long-peduncled; flowers small for the genus, obscurely puberulous within. *Filaments* nearly glabrous; anthers very short. *Ovary* glabrous.

2. **M. Gammieana,** *King in Herb. Calcutt.*; quite glabrous, leaves linear- or ob-lanceolate finely acuminate brown beneath when dry, nerves very slender oblique, panicles longer than the leaves with spreading branches, perianth ⅛ in. diam., pedicels twice as long, fruit 1½ in. diam. globose.

SIKKIM HIMALAYA, *Herb. King*; Darjeeling, alt. 7500 ft., *J. D. H.*

Branches with pale bark. *Leaves* 5–7 in., hardly shining above, base much attenuated; petiole ¾ in.; nerves 10–20 pair, very slender. *Panicles* long-peduncled, branches spreading, corymbosely few-fld. *Perianth* short, lobes obtuse, silky within. *Filaments* very hairy. *Anthers* oblong.—King's flowering specimen has much fewer (10–12 pair) nerves than the fruiting (15–20).

3. **M. Clarkeana,** *King in Herb. Calcutt.*; quite glabrous, leaves 6–10 in. narrowly elliptic-lanceolate acuminate brown on both surfaces when dry, panicles few-fld, shorter than the leaves, peduncles and pedicels stout, perianth ⅓–½ in. diam. nearly glabrous, fruit globose.—M. odoratissima γ., *Herb. Ind. Or. H. f. & T.* (not of Meissn.).

SIKKIM HIMALAYA; alt. 5–8000 ft., *J. D. H.*, *Treutler*, *King.*

Branches stout, black when dry. *Leaves* 1–1½ in. broad, young glabrous except the densely silky very young ones which resemble bud-scales; petiole very short. *Panicle* 2–2½ in., black and subglaucous when dry; flowers the largest of the genus. *Sepals* linear-oblong, nearly glabrous within. *Filaments* long, hairy towards the base; anthers linear-oblong. *Fruit* (detached) ¾ in. diam.—The long narrow leaves, very robust few-fld. panicles and thickly pedicelled large flowers are prominent characters of this very distinct-looking plant.

4. **M. ? Khasyana,** *Meissn. in DC. Prodr.* xv. 1. 42; leaves membranous glabrous lanceolate or oblanceolate or obovate acute dark brown above when dry blue-glaucous beneath reticulate on both surfaces, nerves strong arched, panicles usually long-peduncled hoary shorter than the leaves, perianth-lobes rounded.

KHASIA MTS., *Griffith.*

Branches very short, rough with the scars of fallen leaves. *Leaves* 6–10 by 1½–3 in.; nerves 10–15 pair; petiole 1–1½ in., stout. *Panicles* 3–6 in.; flowers corymbose, ⅛ in. diam., more globose than usual in the genus. *Filaments* very short indeed; anthers broad. *Ovary* glabrous; style long, slender. *Fruit* unknown.—The subglobose buds, with broad almost rounded perianth-lobes, and very dark membranous leaves, are unlike those of any other species.

** *Panicles pubescent.* (The species all want further investigation.)

5. **M. Gamblei,** *King in Herb. Calcutt.*; leaves 3–4 in. thinly coriaceous obovate to elliptic-lanceolate obtuse acute or caudate-acuminate very pale and glabrous or subsilky beneath, petiole slender, panicles few-fld. shorter than the leaves, pedicels slender, flowers silky, fruit small globose. M. odoratissima, β. canescens, *Blume Mus. Bot.* 330; *Meissn. in DC. Prodr.* xv. 1. 41 (*the Assam plant only*).

NORTHERN BENGAL; Cooch Behar, *King*. ASSAM, *Jenkins*, *Griffith*.

Branches rather slender, dark. *Leaves* sometimes elliptic or lanceolate, acute at both ends, finely reticulate above; nerves 8–10 pair, very slender, oblique; petiole ½ in., glabrous or pubescent. *Perianth-lobes* linear-oblong, villous or tomentose within. *Filaments* very slender, nearly glabrous; anthers oblong. *Fruit* (quite young) ¾ in. diam. "always globose," *King*.—This looks different from *M. odoratissima* in the broad pale leaves with cuneate bases.

6. **M. Listeri,** *King in Herb. Calcutt.*; leaves 3–5 in. glabrous oblong or lanceolate rarely obovate glaucous beneath, petiole slender, panicles shortly peduncled shorter than the leaves hoary-pubescent, pedicels long slender, flowers silky, fruit globose 1 in. diam.

UPPER ASSAM; Narainporé and Dukrung Valley in the Duphla Hills, alt. 3000 ft., *Col. Lister*.

The plants sent me by King as flowering and fruiting specimens of this are considerably different; the first (from Narainpore, which resemble *M. Gamblei*) have slender branches and elliptic-lanceolate acuminate leaves with very slender nerves; the fruiting ones have much thicker obovate or oblong leaves with stouter petiole midrib and nerves. *Flowers* ¾ in. long; pedicel twice as long as the perianth, which is about ⅓ in. long and silkily tomentose without and within; lobes linear-oblong. *Filaments* short, nearly glabrous; anthers oblong. *Style* very slender.

5. **M. edulis,** *King in Herb. Culcutt.*; young leaves and panicles subvillously tomentose, leaves obovate oblong or oblanceolate substrigose beneath or glabrate with many rigid prominent nerves, tip rounded acute or acuminate, panicles stoutly peduncled appearing with the young leaves, perianth deciduous?, fruit very large globose.

SIKKIM HIMALAYA; near Darjeeling, alt. 6000 ft., *Herb. Griffith*, *King*, *Lister*.

Branches of old wood as thick as a swan's quill, woody, with prominent large leaf-scars; bark rugged. *Leaves* 5–6 by 1½–2½ in., brown when dry, thinly coriaceous, narrowed from above the middle to the base; nerves 10–12 pair, very oblique, nearly straight; petiole ½–¾ in., rather slender. *Panicles* densely softly tomentose, 3–4 in. long including the long peduncle; branches short, stout, few-fld.; flowers about ½ in. diam. *Perianth-lobes* broadly oblong, villous within. *Filaments* very short, broad, villous; anthers broad. *Fruit* nearly 2 in. diam., on a stout woody peduncle, with no trace of a perianth.—Young shoots smooth and very stout, terminal leaves and large terminal buds enclosed in imbricating subsilky scales, the outer of which are semicircular, and the inner oblong and ¾ in. long.

8. **M. bootanica,** *Meissn. in DC. Prodr.* xv. 1. 42; branches leaves beneath and panicles hoary-pubescent, leaves 8–10 in. long-petioled membranous obovate abruptly acuminate, nerves slender, panicles long-peduncled few-fld., flowers large.

BHOTAN; in woods near Chuka, alt. 4000 ft., *Griffith*.

"A moderate-sized tree," *Griff.* *Branches* stout, wood rugged with very large leaf-scars. *Leaves* pale brown beneath when dry; nerves 15–20 pairs, spreading, nearly straight; petiole 2–2½ in. *Panicles* 6–8 in. long, including the long stout peduncle; branches few and few-fld.; pedicels long (for the genus) often ⅓ in. long;

flowers ⅓ in. diam. *Perianth-lobes* oblong, finely tomentose without and within. *Filaments* long, villous; anthers narrow. *Fruit* unknown.—A very distinct-looking plant from its large broad membranous leaves and large long-pedicelled flowers.

9. **M. sericea,** *Blume Mus. Bot.* i. 330; branches very stout and panicles hoary-pubescent, leaves long-petioled 6–8 in. coriaceous oblong-lanceolate acuminate young silky beneath, nerves very slender, panicles 4–8 in. long, branches usually short few-fld. *Meissn. in DC. Prodr.* xv. 1. 41. Phœbe sericea, *Nees Syst. Laurin.* 99 (*excl. syn. Fl. Nep.*); *Meissn. l. c.* 35. Ocotea sericea, *Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 82. Laurus sericea, *Wall. Cat.* 2606.

CENTRAL HIMALAYA; Nepal and Kumaon, in the Deyra hoon, *Wallich.*

Branches as thick as a swan's quill. *Leaves* when young polymorphous, oblong to lanceolate obtuse acute or acuminate, base acute or rounded, white-silky beneath; old leaves rigidly coriaceous, brown when dry, rather glaucous beneath, finely reticulate on both surfaces; nerves 12–15 pair, arched; petiole 1–1½ in. *Panicles* sometimes very long, with few short branches; flowers shortly pedicelled, ⅛–⅙ in. diam. *Filaments* short, hairy; anthers narrow. *Fruit* unknown.—Wallich's specimens of *Laurus sericea,* A, B, C, may or may not belong to one species; it is described by Nees as a *Phœbe*; but Blume afterwards separated some of the specimens as *Machilus sericea,* observing that it differs from the *Phœbe* in the absence of rings (caused by the fall of the bud-scales) at the bases of the branches. This difference is due to the age of the branches, of which the old bear scars of scales, which scales the first year's shoots do not bear. Meissner quotes Wallich's 2606 B under both. The specimens are very bad, and are all possibly referable to *M. odoratissima,* but the petioles are longer. The Nepal specimens have hairy filaments and anthers, those of the Kumaon ones are glabrous. When the Western Himalayan *Machili* are cleared up, *M. sericea* will probably be suppressed as being a composite book-species.

10. **M. odoratissima,** *Nees in Wall. Pl. As. Rar.* ii. 70, and *Syst. Laurin.* 172; glabrous except the panicle, leaves 3–9 in. long-petioled lanceolate or oblong or elliptic-lanceolate acuminate usually slightly glaucous beneath, nerves slender, panicles long- or short-peduncled hoary-tomentose or glabrous, flowers glabrous or pubescent, fruit oblong or globose. *Meissn. in DC. Prodr.* xv. 1. 40; *Brand. For. Fl.* 378; *Gamble Man. Ind. Timb.* 308; *Blume Mus. Bot.* i. 329. M. indica, *Kurz For. Fl.* ii. 291; *Miquel Fl. Ind. Bat.* i. 1. 914 (*excl. var.* β.). M. rimosa, *Blume l. c.* 330; ? *Meissn. l. c.* 42; ? *Kurz l. c.* 292. Laurus odoratissima, *Wall. Cat.* 2607. L. indica, *Lour. Fl. Coch.* i. 311 (*ex Nees*). L. Champa and L. bombycina, *Herb. Hamilt.*

SUBTROPICAL and TEMPERATE HIMALAYA, from Murree eastwards; ascending to 8000 ft. in Sikkim; ASSAM and the KHASIA MTS. TENASSERIM and MARTABAN, alt. 3–7000 ft. ? SINGAPORE, *Wallich.*—DISTRIB. Java, Sumatra, Cochin China.

A large tree, stunted at high elevations, shoots pubescent. *Leaves* very variable in breadth, coriaceous; nerves irregular, usually 15–20 pair; petiole ½–¾ in., slender. *Panicles* about equalling the leaves, but very variable, loosely branched; peduncle glabrous hoary or subsilkily pubescent, as are the flowers, which are sometimes corymbose on the short branches. *Perianth* ⅙–¼ in. diam.; lobes oblong obtuse, lengthening a little after flowering. *Filaments* glabrous or slightly hairy; anthers oblong, rarely hairy. *Fruit* ½–⅔ in. long.—I am very much puzzled with this plant, and suspect that it consists of several species, the differences being marked between the specimens with glabrous and those with silkily pubescent perianths, and those with globose and with oblong fruit. The type of the species is *Laurus odoratissimus,* Wall. Cat. 2607, from Nepal, which has copiously silkily pubescent shoots and panicles (which however are hardly developed); No. 2607 C and D (from Herb. Hamilton) with globose fruit seem the same; and other specimens with globose fruit are from Sikkim and Simla. The other form is Wallich's 2607 B from Kumaon, with glabrous panicles, of which there are flowering specimens from Kumaon (*M. odoratissimus* and *Ocotea ligustrina*, Herb. Strach. and Winterb.) accompanied by specimens with oblong fruit. Furthermore, glabrous panicles with oblong fruit occur in Sikkim and ? Singapore, and oblong fruit in Bhotan. Of *M. rimosa*, Blume, little is known; Kurz describes it as differing from *M. odoratissimus* in the smaller flower. The Moulmein plant referred to *rimosa* by Meissner has small flowers, but the specimen is too small to judge of its identity. Wallich's Singapore locality I suspect to be erroneous.

11. **M. villosa,** *Hook. f.*; shoots and panicles densely softly ashy or rufous-tomentose, leaves 3–5 in. coriaceous elliptic or elliptic- or linear-lanceolate or oblanceolate obtuse acute or acuminate, pale above brownish beneath, nerves 6–8 pair, panicles subterminal fascicled usually longer than the leaves, branches spreading, flowers densely tomentose, fruit globose. Ocotia glaucescens, *Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 32. Phœbe glaucescens, *Nees Syst. Laurin.* 100 and 671; *Meissn. in DC. Prodr.* xv. 1. 36. P. villosa, *Wight Ic.* t. 1822; *Kurz For. Fl.* ii. 290. Laurus glaucescens, *Roxb. ex Wall. Cat.* 2592 (*not of Fl. Ind.*). L. floribunda, *Wall. Cat.* 2593 B. L. villosa, *Roxb. Fl. Ind.* ii. 310. (L. villosa & glaucescens, *Ic. Roxb.*)

SIKKIM HIMALAYA; alt. 7000 ft., *Gamble.* UPPER ASSAM; Nuku Hills, *Simons, Griffith* (*Kew Distrib.* 4261); Patkoye Hills, *Griffith* (*Kew Distrib.* 4259). SILHET, *Wallich.* CACHAR, *Keenan.* CHITTAGONG, *Roxburgh, J. D. H. & T. T.*

A large tree; branchlets dark brown. *Leaves* very pale, rather shining above, base very acute; nerves strong beneath; petiole ¼–½ in. *Panicles* sometimes excessively numerous and umbellate, almost terminating the branches, the minute villous terminal bud not lengthening; peduncle stout, branches spreading; flowers subcorymbose, shortly pedicelled. *Perianth* hemispheric, densely tomentose; lobes short, broad, rounded. *Filaments* and anthers short, glabrous. *Berry* globose, ⅓ in. diam., seated on the reflexed calyx.—Specimens collected in fruit by Keenan, together with Roxburgh's excellent drawings (it is unquestionably his *L. villosa*), prove this to be a *Machilus.* Much confusion has attended its history from Roxburgh having figured it under two names (*glaucescens* and *villosa*), and by his having further, as pointed out by Wight, described two plants under the name of *glaucescens.* Of these names Wallich took *glaucescens* for his No. 2592, which is that which Roxburgh described as *villosa.* Roxburgh's other plant described under *L. villosus*, with alternate triple-nerved leaves and flowers in lateral panicles, is no doubt an *Actinodaphne.*

12. **M. fruticosa,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 101, and *For. Fl.* ii. 292; glabrous except the hoary panicles, leaves 4–6 in. thickly coriaceous oblong or linear- or elliptic-oblong obtuse or obtusely acuminate dark brown above glaucously brown beneath, nerves faint beneath, panicles axillary long-peduncled, flowers very small corymbose, fruit small globose.

TENASSERIM; at Mergui, *Griffith* (*Kew Distrib.* 4262), *Helfer* (*Kew Distrib.* 4268); Martaban, alt. 4000 ft., *Brandis.*

Branches stout, black. *Leaves* rounded or acute at both ends, often shining above, margin sometimes recurved; nerves 10–12 pair; petiole ½ in. *Panicles* 3–8 in. long, stiff, black when dry, branches spreading; flowers about ⅙ in. diam., hoary; pedicels about twice as long. *Perianth* subglobose; lobes rounded, obtuse, hoary. *Filaments* glabrous, except at the base; anthers oblong. *Fruit* "the size of a pea, on a long thickened pedicel," *Kurz.*—I have seen no fruit.

13. **M. macrantha,** *Nees in Wall. Pl. As. Rar.* ii. 70, and iii. 31, and *Syst. Laurin.* 174; leaves long-petioled glabrous from oblong rounded at both ends to elliptic-lanceolate and acute at both ends rarely obovate bluish and glaucous beneath, panicles in subterminal corymbs longer or shorter than the leaves much branched more or less hoary-pubescent, perianth tomentose, filaments villous, fruit globose. *Meissn. in DC. Prodr.*

xv. 1. 40; *Wight Ic.* t. 1824; *Beddome For. Fl.* t. 264; *Thwaites Enum.* 254; *Dalz. & Gibs. Bomb. Fl.* 221. M. glaucescens, *Wight Ic.* t. 1825 (*excl. syn.*); *Dalz. & Gibs. l. c.* Cryptocarya floribunda, *Miquel Pl. Hohenack.* n. 1458 (*not of Nees*). Laurus macrantha, *Wall. Cat.* 2587.

DECCAN PENINSULA; on the Ghats from the Concan southwards, ascending to 7000 ft. CEYLON, alt. 1500–4000 ft.

A large tree; branches brown when dry. *Leaves* 3–9 by 1½–3½ in., finely reticulate on both surfaces; nerves 8–12 pair, slender, sometimes indistinct; petiole slender, 1–1½ in. *Panicles* grouped in a subterminal corymb as in *M. villosa*, sometimes 10 in. long and with very long peduncle and spreading branches; at others short and subsessile, peduncle and branches from hoary-pubescent to glabrate; flowers very variable in size, ⅓–¼ in. diam. *Perianth* tomentose without and within; lobes oblong or linear-oblong. *Anthers* pubescent. *Fruit* black, ⅓–¾ in. diam.—I can find no characters whereby to distinguish Wight's *glaucescens* from *macrantha*. Dalzell and Gibson describe the fruit of the former as about the size of a small gooseberry, and of the latter as of a large currant. The length of the petiole at once distinguishes it from *M. villosa*, as does the pubescence of the panicle.

9. PHŒBE, *Nees.*

Evergreen trees or shrubs. *Leaves* alternate or scattered, penninerved. *Flowers* small, 2-sexual or polygamous, in axillary and subterminal panicles. *Perianth-tube* short; segments 6, subequal, erect and enlarging and clasping the base of the fruit. *Perfect stamens* 9; filaments of 1st and 2nd series eglandular with introrse 4-celled anthers, of 3rd series 2-glandular with extrorse 4-celled anthers; staminodes of 4th series cordate or sagittate. *Fruit* ellipsoid or oblong, clasped at the base by the hardened perianth-segments.—Species about 26, Indian and Malayan.

Phœbe, which in the "Genera Plantarum" is reduced to *Persea*, must, I think, be restored; the fruiting perianth is very characteristic and habit uniform.

Perianth quite glabrous.

1. **P. lanceolata,** *Nees Syst. Laurin.* 109; quite glabrous, leaves elliptic-lanceolate finely or caudate-acuminate, perianth glabrous, segments equal, fruit ½ in. *Meissn. in DC. Prodr.* xv. 1. 34 (*excl. var. γ.*); *Wight Ic.* t. 1821; *Brandis For. Flor.* 377; *Kurz For. Fl.* ii. 290; *Gamble Man. Ind. Timb.* 308; ? *Beddome For. Man.* 184. Ocotea lanceolata, *Nees in Wall. Pl. As. Rar.* ii. 71. Laurus lanceolata, *Wall. Cat.* 2599. L. lanceolaria, *Roxb. Fl. Ind.* ii. 309. L. salicifolia and L. ? camphorata, *Herb. Hamilt.*

SUBTROPICAL HIMALAYA, from Simla eastwards, ascending to 6000 ft. KHASIA MTS., common. BURMA, *Griffith.* MARTABAN and TENASSERIM, *Kurz.* SOUTH DECCAN, Nilghiri Hills and southward, alt. 3000 ft., *Beddome.*

An evergreen tree; branches slender, bark usually yellowish white. *Leaves* 5–10 by 1–2½ in., thinly coriaceous, pale when dry above and pale brown beneath, base very narrow; nerves 6–10 pair; petiole slender, ¼–½ in. *Panicles* axillary, very variable, shorter or longer than the leaves, peduncle sometimes strict and 1–2 in., at others curved and 4–6 in., branches few; flowers 1/10–⅛ in., pale yellow or white. *Perianth* cup-shaped; segments broad, obtuse, pubescent within, hardening and clasping the fruit, which is narrowly ellipsoid, black.—Nees describes the leaves as very finely pubescent beneath. I have seen no Deccan specimens. Very near *P. declinata*, Nees, of the mountains of Java. Var. γ. *ligustrina*, Meissn., is *P. declinata*, Nees.

2. **P. angustifolia,** *Meissn. in DC. Prodr.* xv. 1. 34; quite glabrous

leaves very narrowly lanceolate acuminate or caudate, perianth glabrous, segments equal, fruit ½ in.

Khasia Mts., alt. 2–4000 ft., *Griffith, Lobb, J. D. H. & T. T.*

A small shrub, perhaps only a form of *P. lanceolata*, but the leaves are much narrower, 4–10 by ½–1 in.

3. **P. declinata,** *Nees Syst. Laur.* 114; quite glabrous, branches black when dry, leaves elliptic-lanceolate or -oblong obtuse or obtusely acuminate red brown, nerves 6–8 pair very obscure beneath, perianth glabrous, segments subequal. *Meissn. in DC. Prodr.* xv. 1. 34; *Miquel Fl. Ind. Bat.* i. 1. 906. P. ligustrina, *in part, Nees Syst.* 113. P. lanceolata, γ. ligustrina, *in part, Meissn. l. c.* Oocotea declinata, *Blume Bijd.* 572. O. ligustrina, *in part, Nees in Wall. Pl. As. Rar.* ii. 71, and iii. 32. Laurus declinata, *Blume Cat. Hort. Bot. Buitenz.* 66. L. ligustrina, *Wall. Cat.* 2588 A.

Singapore, *Wallich.*—Distrib. Java.

A very distinct species, remarkable for the black shoots, brown finely reticulate leaves, 4–5 by 1–1¼ in., with slender black petioles and midrib beneath, and very faint slender nerves.—I have seen no fruit. Wallich's 2588 B from Tavoy consists of three specimens of two plants, both different from *declinata*, one is probably *P. lanceolata*; two others have elliptic acute thin reticulated leaves only 2 in. long, with numerous very slender spreading nerves; these resemble no other species except in the flowers, which are like those of *P. lanceolata*, but rather smaller.

** *Perianth silky pubescent or tomentose.*

4. **P. pallida,** *Nees Syst. Laurin.* 112; shoots very finely puberulous, leaves elliptic-lanceolate or oblanceolate finely acuminate puberulous beneath at length glabrous, nerves 8–10 pair very oblique deeply impressed above strong beneath, panicles axillary long-peduncled and flowers very finely pubescent. *Meissn. in DC. Prodr.* xv. 1. 34; *Brandis For. Fl.* 377. P. glaucescens & fuscans, *Meissn. l. c.* 37, *in part.* Laurus pubescens, *Wall. Cat.* 2595 (*excl.* B, C). Ocotea pallida, *Nees in Wall. Pl. As. Rar.* ii. 71.

Subtropical Himalaya; Kumaon, *Thomson, Strachey & Winterbottom*; Nepal, *Wallich.* ? Sikkim, *J. D. H.* Eastern Oude forests, *Brandis.*

Very closely allied to *P. lanceolata*, but the young leaves, panicles and flowers are finely tomentose, and the leaf-nerves deeply sunk above.—The Sikkim specimens doubtfully referred here are flowerless, the leaves are much larger, 6–10 by 1½–3½ in., more membranous, and the nerves less deeply sunk, as might be expected in plants from a moist climate; they are certainly not referable to *Laurus glaucescens* (*Machilus villosa*) as Meissner supposed, and have not the rusty tomentum of *P. paniculata. Fruit* too young for description.

5. **P. paniculata,** *Nees Syst. Laurin.* 105; shoots rusty-tomentose, leaves elliptic or elliptic-lanceolate rarely obovate acuminate pubescent and with 8–12 pair of very strong nerves beneath, panicles axillary long-peduncled and flowers pubescent or tomentose, fruit turgidly ellipsoid ⅓–½ in. *Meissn. in DC. Prodr.* xv. 1. 37 (*excl. syn. Laurus villosa and Phœbe villosa*); *Brand. For. Fl.* 377 (*excl. syn. L. villosa*); *Wight Ic.* t. 1820. P. pubescens, *Nees Syst. Laur.* 107; *Kurz For. Fl.* 290. P. Wightii, *Meissn. in DC. l. c.* 38; *Beddome Forest. Fl.* t. 292. Ocotea pubescens & paniculata, *Nees in Wall. Pl. As. Rar.* ii. 71, 72, and iii. 32. Laurus paniculata, *Wall. Cat.* 2598. L. pubescens, *Wall. Cat.* 2595 B, C. Cinnamomum tomentosum and C. Cathia, *Don Prodr.* 66 (*fide Nees*).

Central Himalaya; Nepal, *Wallich.* Burma; from Chittagong and Ava to

Tenasserim, *Griffith* (*Kew Distrib.* 4271), *Kurz*, &c. NILGHIRI HILLS, alt. 5–6000 ft., *Wight*, &c.

The ferruginous tomentum of the young shoots, usually shorter and broader leaves pubescent or even tomentose beneath, with stronger nerves and nervules, best distinguish this from *P. pallida*. The fruit is quite like that of *P. lanceolata*, but rather broader.—Very near *P. multiflora*, Blume, of Java.

6. **P. attenuata,** *Nees Syst. Laurin.* 104 (*excl. syn. Blume*); branches very stout, young shoots and leaves beneath rusty-pubescent or -villous, leaves oblanceolate acute or acuminate, nerves 15–20 pair, panicles stoutly peduncled and flowers tomentose. *Meissn. in DC. Prodr.* xv. 1. 38. Ocotea attenuata, *Nees in Wall. Pl. As. Rar.* ii. 71. Laurus attenuata, *Wall. Cat.* 2600.

EASTERN HIMALAYA; Sikkim, *Gamble, King.* BHOTAN, *Griffith* (*Kew Distrib.* 4254), *King.* SILHET, *Wallich.*

Well distinguished by the very stout branches, leaves broadening upwards, 5–10 by 1½–3 in., more numerous nerves, and stout petioles, peduncles and branches of the panicle. *Flowers* ¼ in. diam., shortly stoutly pedicelled. *Fruiting perianth* ⅓ in. long, campanulate, very rigid; fruit nearly ⅔ in. long, narrowly ellipsoid.

7. **P. opaca,** *Blume Mus. Bot.* i. 327; branches very stout, leaves rigidly coriaceous obovate obovate-cuneate or oblanceolate rarely oblong abruptly obtusely acuminate subglabrous or puberulous beneath, nerves 10–12 pair, panicles and flowers rusty-pubescent. *Miquel Fl. Ind. Bat.* i. 1. 909. P. attenuata, *Miquel in Herb. Jungh.* P. malaccensis, *Meissn. in DC. Prodr.* xv. 1. 37. Alseodaphne ? grandis, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 183; *Meissn. l. c.* 28. Laurus grandis, *Wall. Cat.* 2594 A. Persea grandis, *Nees in Wall. l. c.* iii. 32. P. lucida, *Blume.*

MALACCA, *Griffith, Maingay.* PENANG, *Porter.*—DISTRIB. Java, Sumatra, Borneo.

Young parts finely rusty-pubescent. *Leaves* very variable, 5–10 by 2–4 in., brown when dry, usually shining above and subglaucous beneath, base acute, rarely obtuse; petiole ⅓–1 in. *Panicles* numerous, usually shorter than the leaves; peduncles stout, finely pubescent; flowers numerous, ⅙ in. diam., pedicelled; fruiting panicle very stout indeed, a foot long, with thickened branches and pedicels. *Fruiting perianth* broadly campanulate, very rigid. *Fruit* ¾ in. long, ellipsoid. *P. lucida*, Blume, of Sumatra and Borneo, seems the same.

8. **P. Tavoyana,** *Hook. f.*; young shoots petioles and nerves beneath silky or rusty-villous, leaves membranous elongate-lanceolate caudate-acuminate pubescent or tomentose beneath, nerves 10–15 pair, panicles with very slender peduncles and flowers pubescent. Machilus Tavoyana, *Meissn. in DC. Prodr.* xv. 1. 41; *Kurz For. Fl.* ii. 292.

TENASSERIM; King's Island, Mergui Archipelago, *Helfer* (*Kew Distrib.* 4260); Tavoy, *Parish.*

Apparently a very distinct species, nearest to *P. attenuata*, but with membranous leaves 5–10 by 1–2 in., ending in very slender tails, slender petioles sometimes 2½ in., and very slender flowering panicles.—The specimens are in bud and young fruit; the perianth in the latter is ⅙ in. long, very rigid, as in the genus.

10. ALSEODAPHNE, *Nees.*

Evergreen trees. *Leaves* usually subverticillate towards the ends of the branches, penninerved, often obovate. *Flowers* bisexual, subumbellate on the branches of axillary and subterminal panicles. *Perianth-tube* short; segments 6, subequal or the three outer smaller, deciduous or not at all enlarged after flowering, obsolete in fruit. *Stamens* and *staminodes* as in *Phœbe*. *Fruit* ellipsoid, seated on the truncate end of the long or short often much swollen and fleshy peduncle.—Species about 15, Tropical Asiatic.

Habit of *Dehaasia*, but anthers 4-celled. The species are very imperfectly known.

* *Perianth-segments subequal or the outer rather narrower.*

1. **A. semecarpifolia,** *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 182; nearly glabrous, leaves coriaceous cuneately obovate or oblong tip obtuse or rounded 6–8-nerved often glaucous beneath, panicles long-peduncled branches spreading, perianth nearly glabrous segments subequal, fruit ellipsoid acute equalling its swollen warted peduncle. *Meissn. in DC. Prodr.* xv. 1. 28; *Wall. Cat.* 2586 A; *Dalz. & Gibs. Bomb. Fl.* 222; *Wight Ic.* t. 1826, 1827; *Thwaites Enum.* 254; *Beddome For. Fl.* t. 297.

DECCAN PENINSULA; in dry forests from the Concan southwards. CEYLON in the drier parts of the island.

A small tree, very variable in foliage, young parts obscurely puberulous. *Leaves* 2–7 in., usually very finely reticulate above when dry and glaucous beneath, base acute; nerves faint or strong; petiole ½–1 in. *Panicles* about as long as the leaves or shorter; peduncle and branches slender, glabrous, black when dry; flowers on rather long pedicels, ⅛ in. diam., subumbellate at the tips of the branches. *Perianth-segments* usually subequal, but in one specimen from Herb. Stocks the outer are as short as in the next section.—The following seem to be forms of one species, but I am far from confident about this.

1. A. SEMECARPIFOLIA proper; leaves rather thinly coriaceous glaucous beneath, panicles equalling the leaves, fruit ½–⅝ in.

Var. *angustifolia*, Meissn. l. c.; leaves 3–5 by 1–1½ in. elliptic-oblong or -lanceolate obtuse or subacute glaucous beneath, panicles as long as the leaves, fruit ⅝ in. rather narrower.—Ceylon and the Concan.

Var. *macrocarpa*; leaves 4–7 in. elliptic-oblong subacute very glaucous beneath tip rounded, fruit 1 in., peduncle much thickened.—Ceylon, *Thwaites* (C. P. 2269).

Var. *rufa*; young parts and young leaves beneath rufous-hoary, leaves broadly cuneate-obovate very coriaceous red when dry tip rounded, panicles as long as the leaves, fruit ½ in.—Concan, *Herb. Dalzell.*

Var. *parvifolia*; leaves 2–3 in. obovate very glaucous beneath tip rounded, petiole very short, panicles much shorter than the leaves. *Wight Ic.* t. 1827.—Courtallum, *Wight.*

2. **A. peduncularis,** *Hook. f.*; quite glabrous, branches slender, leaves membranous elliptic-lanceolate obtusely subcaudate-acuminate, nerves 6–10 pair, panicles very slender few-fld. much shorter than the leaves, perianth glabrous outer segments rather smaller, stamens very short. Haasia peduncularis, *Nees Syst. Laurin.* 376; *Meissn. in DC. Prodr.* xv. 1. 61. Machilus peduncularis, *Nees in Wall. Pl. As. Rar.* ii. 70. Persea peduncularis, *Nees Syst. Laurin.* 125 (*excl. syn. Rumph.*). Laurus peduncularis, *Wall. Cat.* 2596.

PENANG, *Wallich.*

Branches with white bark, except the first year's, which are smooth and very slender. *Leaves* 4–6 by 1½–2 in., rather wavy from their thin texture, base very acute; nerves beneath much raised, slender, arching and meeting far within the margin; petiole ⅛–½ in., very slender. *Panicles* 1–1½ in., peduncle and branches filiform; flowers ⅒ in., pedicelled. *Perianth* subglobose, segments short, quite glabrous without (persistent, *Nees*). *Stamens* very short, hairy; staminodes? *Fruit* according to Nees immature, ovoid, in a cylindric fleshy curved pedicel two inches long and as thick as a goose-quill.—Wallich's specimens in the Linnæan Society have neither flower nor fruit, but I find one or two flowers in Herb. Hook. which were bisexual and agree with Nees' description except in that the anthers are decidedly 4-celled. The slender habit and thin leaves are unlike its congeners.

3. **A. decipiens,** *Hook. f.*; nearly glabrous, leaves subverticillate rigidly coriaceous cuneately obovate or lanceolate very obtusely acuminate glaucous beneath, nerves 8–10 pair sunk above very strong beneath, panicles shorter than the leaves shortly peduncled, perianth minutely hoary, outer segments rather smaller.

SINGAPORE, *N. Cantley.*

Branches rather robust, bark brown. *Leaves* 4–6 by 1½–2½ in., base very acute, smooth, brown above and not reticulated, finely reticulate and bluish beneath; petiole ⅓–¾ in. *Panicles* rather stout, loosely branched, branches and pedicels obscurely puberulous; flowers 1/12 in. diam., subglobose. *Perianth-segments* hairy within, as are the stamens and staminodes.—Very similar to *Dehaasia cuneata*, Bl.

4. **A. petiolaris,** *Hook. f.*; branches very stout subverticillate, leaves very large thickly coriaceous long-petioled oblong or oblong-obovate obtuse or subacute not narrowed into the petiole glabrous, nerves 8–10 pair very strong, panicles very stout longer or shorter than the leaves sparsely scurfy, fruit 1½ in. oblong much longer than the cylindric pedicel. Nothaphœbe ? petiolaris, *Meissn. in DC. Prodr.* xv. 1. 59.

ASSAM; on the Nuku Hills, *Simons.* CACHAR, *Keenan.*—DISTRIB. Burma; in the Hookhoom Valley, at Camein, *Griffith.*

A large tree, branchlets as thick as the little finger. *Leaves* 8–12 by 4–6 in., shining and reticulated above, brown on both surfaces, young glaucous beneath, base acute or cuneate; petiole very stout, 1⅓–2½ in. *Panicles* about half the length of the leaves, loosely branched often from near the base; branches stout, ascending, when fruiting as thick as a duck's quill and soft; flowers shortly pedicelled, ⅙–⅕ in. diam. *Perianth* scurfy, segments short, subequal, obtuse. *Fruit* apparently very fleshy, top rounded, pedicel ¼–⅓ in. long.

** *Outer segments of the perianth much smaller than the inner.* (See also *A. semecarpifolia.*) (NOTHAPHŒBE, *Blume.*)

5. **A. umbelliflora,** *Hook. f.*; nearly glabrous, leaves scattered very coriaceous elliptic-oblong or lanceolate caudate-acuminate shining above, panicles much shorter than the leaves, fruit oblong much longer than the short cylindric pedicel. Nothaphœbe umbelliflora, *Blume Mus. Bot.* i. 328; *Meissn. in DC. Prodr.* xv. 1. 58. Ocotea umbellifera, *Blume Bijd.* 573. Phœbe ? umbelliflora, *Nees Syst. Laur.* 115; *Miquel Fl. Ind. Bat.* i. 1. 911. Euphœbe umbelliflora, *Blume in Herb. Lugd. Bat.* Haasia nitida, *Meissn. l. c.* 61.

MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1247, 1247/2).—DISTRIB. Sumatra, Java, Borneo.

Branches rather stout, leafy, bark dark. *Leaves* scattered (not subverticillate at the ends of the branches), 4–6 by 1⅓–2 in., very dark brown above, red-brown beneath when dry, base acute; nerves strong, oblique; petiole ⅓–1 in. *Panicles* 1–2 in., shortly peduncled, faintly rusty-hoary; flowers globose, 1/12 in. diam., glabrous, shortly pedicelled. *Perianth-lobes* nearly glabrous within, outer about half the length of the inner. *Stamens* very short, anthers broad. *Fruit* 1¼ in. long, top rounded; pedicel ⅓ in., woody.—This is the plant mentioned by Wight (under tab. 1831) as having the habit of *Haasia*, but 4-celled anthers.

6. **A. panduriformis,** *Hook. f.*; leaves large very shortly petioled glabrous thinly coriaceous panduriform obtuse base cordate, nerves 16–18 pair, panicles shorter than the leaves, branches short many-fld., perianth

rusty-pubescent, 3 outer segments much shorter, fruit 2½–3 in. long cylindric-oblong, pericarp thin 5-ribbed.

MALACCA, *Maingay.*

Branchlets rather stout, glabrous. *Leaves* 8–12 by 3–4 in., brown on both surfaces, narrowed above the cordate base and then dilating; nerves raised on both surfaces, very numerous in the basal portion; petiole ½ in., very stout. *Panicles* 2–6 in.; peduncle and rachis rather stout and branches glabrous; flowers 1/12 in diam., subglobose, bright yellow, crowded on short pedicels, rusty-pubescent. Outer *perianth-segments* broadly ovate, inner rounded. *Stamens* very short, hairy, as are the staminodes. *Fruit* very remarkable, slightly curved, dull red, somewhat narrowed towards the base, top rounded; pericarp coriaceous, ribs very narrow. *Seed* cylindric.—A distinct species.

*** *Perianth unknown.*

7. **A.** ? **grandis,** *Nees Syst. Laurin.* 183, *in part*; glabrous, branchlets very stout, leaves subverticillate large thickly coriaceous cuneately obovate obtuse or subacute glaucous beneath, nerves 8–10 pair very strong beneath impressed above, panicles shorter than the leaves, fruit globosely ellipsoid apiculate, pedicel very short thickened. *Meissn. in DC. Prodr.* xv. 1. 28, *in part.* Persea grandis in part, *Nees in Wall. Pl. As. Rar.* iii. 32. Laurus grandis, *Wall. Cat.* 2594 C, D.

TENASSERIM; Tavoy, *Gomez.* BURMA, at Amherst, *Wallich.*

Branchlets woody, as thick as a swan's quill, bark rough. *Leaves* 6–12 in., greenish brown when dry, base very acute; petiole stout, ½–1 in. *Fruiting panicles* not very stout, bearing tuberous excrescences (insect nidi ?) on the rachis and under the fruit, the pedicel of which is often deformed. *Fruit* 1 in. long, sometimes seated on the diseased pedicel, which is then woody, rough and as large as a small nut; the healthy pedicels appear to be short, ¼ in. long and cylindric.

8. **A.** ? **costalis,** *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 185; glabrous, leaves 12–24 in. very coriaceous oblanceolate or cuneately obovate glaucous beneath, top rounded or subacute, nerves 12–20 pairs very strong beneath. *Meissn. in DC. Prodr.* xv. 1. 29. Laurus grandis, *Wall. Cat.* 2594 B.

SINGAPORE, *Wallich.*—DISTRIB. Burma; Nammarsa, *Griffith* (Actinodaphne, *Kew Distrib.* 4326).

Leaves pale, 5–8 in. diam., opaque, when dry midrib flat above, nerves hardly immersed, base very narrow; petiole stout, 1–3 in.—Wallich's specimens consist of leaves only, Griffith's of leaves and branches; the latter are as thick as the thumb, smooth, striate with a very thick pith, and bear axillary globose flower-buds ½–¾ in. diam., clothed with orbicular silky scales.—The genus is altogether doubtful.

9. **A. crassipes,** *Hook. f.*; branchlets and shoots rusty-tomentose, leaves coriaceous scattered long-petioled elliptic-lanceolate acuminate falcately recurved, nerves 6–8 pair capillary, fruiting peduncles very thick woody, fruit ⅓ in. ellipsoid twice as long as the very thick woody cylindric pedicel.

MALACCA, *Maingay.*

Branches stout, woody, smooth, bark ashy. *Leaves* 4–5 by 1–1½ in., very pale, nerves excessively slender and very laxly reticulate on both surfaces, base very acute; petiole slender, ⅓–1 in. *Fruiting peduncles* numerous, 3–4 in., very strict, often thickened upwards, as rigid and woody as the branches and thicker at the top than the pedicel is broad; pedicels ¼–⅓ in. long, cylindric, black, confluent with the thickened ends of the panicle. *Fruit* smooth, "dark blue-black, pruinose, globose, pedicel red," *Maingay.*

DOUBTFUL SPECIES.

A? LUCIDA, *Nees in Wall. Pl. As. Rar.* ii. 72, and *Syst. Laurin.* 186; branches stout lenticellate, leaves 8–12 in. scattered very coriaceous obovate-oblong acuminate base obtuse shining above paler beneath, nerves 16–20 pair spreading slender, midrib prominent above, reticulations beneath very faint, petiole 1–1½ in. terete thickened and rugose at the base. *Meissn. in DC. Prodr.* xv. 1. 29. Laurus ? ? lucida, *Wall. Cat.* 2590.—Singapore, *Wallich.*—Probably not a Laurineous plant.

11. ACTINODAPHNE, *Nees.*

Evergreen shrubs or trees. *Leaves* subverticillate, rarely scattered or opposite penni- or triple-nerved. *Flowers* small diœcious, in axillary or lateral dense bracteate sessile or peduncled umbels or clusters; bracts imbricating, caducous (not whorled as in *Litsæa*). *Perianth-tube* short, segments 6, subequal, rarely persistent. *Perfect stamens* 6–9, filaments of the 1st and 2nd series eglandular, of the 3rd 2-glandular; anthers all introrse and 4-locellate; staminodes of fem. 9. *Fruit* seated on the usually enlarged flat or concave perianth-tube.—Species about 50, Eastern Asiatic and Malayan.

The inflorescence is abnormal in *A. sikkimensis* & *leiantha.* The genus is with difficulty separable from *Litsæa.*

* Leaves more or less whorled, penninerved, or if triple-nerved with the lower pair of nerves very short (sometimes triple-nerved in *A. molochina* & *Hookeri*).

† Female fl. in sessile or subsessile clusters or umbels. (In *A. madraspatana* and occasionally in a few others the clusters or umbels are peduncled.) (This is an artificial subdivision, but I can suggest no better, except perhaps into glabrous and villous styles, if enough were known of these.)

a. *Species of Northern India and the Eastern Peninsula.*

1. **A. reticulata,** *Meissn. in DC. Prodr.* xv. 1. 212; leaves 5–7 in. whorled penninerved coriaceous linear- or elliptic-lanceolate acuminate young softly pubescent beneath not glaucous, nerves 12–15 pair very slender, flowers clustered, fruit broadly ellipsoid seated on the cupular quite entire long-pedicelled perianth-tube.

KHASIA MTS.; alt. 4–5000 ft., *J. D. H. & T. T., Clarke.*

A small tree; branches not robust, branchlets when young softly tomentose. *Leaves* in whorls of 4–8, 1–1½ in. diam., greenish and almost shining above, very finely impressed-reticulate on both surfaces, paler beneath, nerves very faint; petiole ⅛ in. *Flowers* ⅙ in. diam.; pedicels as long, both silky; bud-scales nearly glabrous. *Filaments* glabrous. *Fruit* ½ in. long, rather longer than broad, black, pedicel ¾ in., cup ⅓ in. diam.—To a specimen of this in the Hookerian Herbarium, received from Sir J. Smith about 1821, and no doubt sent by Wallich or Hamilton, the habitat, "Nepal? *Wallich,*" was subsequently added by myself, because Smith gave it along with many Nepal plants to Sir W. Hooker at that date. Meissner hence gave Nepal as a habitat, but omitted the query; his var. *glabra* is the same plant with old and therefore glabrous branches.

2. **A. sikkimensis,** *Meissn. in DC. Prodr.* xv. 1. 213; leaves whorled penninerved 3–6 in. membranous lanceolate caudate-acuminate glabrous glaucous or not beneath, nerves 10–12 pair very slender, female

flowers clustered subsessile or pedicelled, fruit oblong seated on the very small quite entire base of the perianth.

SIKKIM HIMALAYA, alt. 3–6000 ft., *J. D. H.*, *Clarke*, *King*.—DISTRIB. Munnipore.

Branches very slender, filaments glabrous; branchlets and young leaves beneath puberulous. *Leaves* in whorls of 4–6, very thin, greenish and almost shining above, paler beneath, not impressed-reticulate; petiole ⅛–⅙ in., slender. *Flowers* very small, subsessile, each 2–4-bracteate independently of the bracts surrounding the whole cluster. *Filaments* and style glabrous. *Fruit* ⅜ in. long, top rounded, pedicel about as long.—The inflorescence is very anomalous.

3. **A. concolor,** *Nees in Wall. Pl. As. Rar.* iii. 31, and *Syst. Laurin.* 593; leaves whorled penninerved 5–7 in. thinly coriaceous elliptic or subcuneate-obovate acuminate base elongate shining above glaucous beneath, nerves 5–8 pair deeply impressed above, flowers subsessile in very small clusters. *Wall. Cat.* 6346; *Kurz For. Fl.* ii. 304.

TENASSERIM; at Tavoy, *Gomez.*

Branches rather slender, young finely rusty-pubescent; scales of leaf-buds clothed with long rufous silky hairs. *Leaves* in whorls of 3, usually broadest above the middle, base much produced, quite smooth and not reticulate above, young obscurely pubescent beneath; petiole ⅓ in. *Clusters* of flowers ⅓–½ in. diam.; flower-buds silkily tomentose, very shortly pedicelled.—Described from Wallich's type specimen, which has buds only; it answers to Meissner's β. *fagifolia*, but it is clear that his *concolor* and its variety are only large and small leaves of the same plant.

4. **A. malaccensis,** *Hook. f.*; branchlets leaves beneath and petioles brown-tomentose, leaves whorled penninerved 4–8 in. coriaceous elliptic-oblong obtuse or subacute polished above, nerves 10–12 pairs strong beneath, female fl. in dense globose clusters very shortly pedicelled or subsessile, fruit globose seated on the very small cup-shaped thickened perianth-tube.

MALACCA, *Maingay.*

Branches rather stout, densely tomentose. *Leaves* dark brown when dry, 1½–3 in. diam., smooth above, at length glabrous beneath, base acute or subacute; petiole stout, ½–¾ in. Clusters of *female fl.* globose, ½ in. diam.; pedicels ⅙ in. long. *Perianth* turbinate, ⅛ in. diam., tube villous within, lobes short, rounded, glabrous. *Style* slender, glabrous; stigma lobulate. *Fruit* ⅓ in. diam.; cup ⅛ in. diam.; pedicel very short and thick.

b. *Species of the Deccan Peninsula.*

5. **A. salicina,** *Meissn. in DC. Prodr.* xv. 1. 212; leaves whorled penninerved coriaceous 4–6 in. linear-lanceolate subcaudate-acuminate glaucous beneath glabrous, nerves 10–12 pair very slender, fruit globose seated on the enlarged 6-lobed perianth-tube.

NILGHIRI HILLS, *Wight*, *Gardner.*

Branches slender, branchlets densely rusty-tomentose. *Leaves* 4–8 in a whorl, ½–¾ in. broad, flat, hardly shining above; petiole ¼–⅓ in. *Flowers* not seen. *Fruit* ⅓ in. diam.; pedicel as long.—Very near *A. stenophylla* of Ceylon in habit, but very different in the fruiting calyx. The supposed Ceylon specimens mentioned by Meissner are not so; they have no collector's name nor locality, and are no doubt Peninsular. I have not seen var. *abbreviata*, which appears to be founded on a shorter leaved specimen.

6. **A. campanulata,** *Hook. f.*; glabrous except the tomentose subsilky inflorescence, leaves whorled penninerved 2–3 in. thinly coriaceous elliptic obtuse base acute green on both surfaces or subglaucous beneath,

nerves 6–8 pair very slender, flowers in simple fascicles, male subglobose shortly pedicelled, female campanulate shortly 6-cleft. A. salicina, *Beddome Fl. Sylv.* t. 295, and *Forest Man.* 186 (*not of Meissn.*).

DECCAN PENINSULA; Tinnevelly, *Beddome*.

Apparently a shrub, with slender whorled glabrous branches. *Leaves* ¾–1½ in. diam., 4–8 in a whorl, minutely impressed-reticulate on both surfaces; petiole ¼–⅓ in. *Flowers*; male ⅛ in. diam., stamens nearly glabrous; female ⅛ in. long, tube silky outside villous within, lobes obtuse glabrous deciduous. *Style* slender, glabrous; stigmas 3, lobulate, stipitate.—Near *M. molochina* in habit, but the slender nerves and female flowers are very different. I think this is undoubtedly what Beddome has figured as *A. salicina*, referring it (For. Man.) to Wight's var. *abbreviata*: he figures the style as hairy, stigma 4-cleft, fruiting calyx cupular with deciduous lobes, and fruit 4 lines in diameter. Female flower same form as in *Litsæa zeylanica*, Wight Ic. t. 1844.

7. **A. lanata**, *Meissn. in DC. Prodr.* xv. 1. 219; branchlets and young leaves densely softly rusty-tomentose, leaves whorled penninerved coriaceous 3–5 in. elliptic-lanceolate acuminate glaucous beneath, nerves 8–10 pair very slender, flowers in sessile clusters, fruit pisiform seated on the wholly persistent 6-lobed perianth.

NILGHIRI MTS., *Wight, Gardner*.

Leaves 4–8 in a whorl; midrib and petiole rusty-tomentose, at length glabrous; petiole ⅓–¾ in., rather slender. *Fruit* ⅓ in. diam., pedicel about as long stout.—Probably a broad-leaved state of *A. salicina*. It is not a Ceylon plant, and it is erroneously placed in the section *Notholitsæa* in the Prodromus.

8. **A. madraspatana**, *Beddome in Herb.*; branchlets and petioles pubescent, leaves whorled penninerved 6–10 in. elliptic-lanceolate obtuse glaucous beneath, nerves 8–10 pair very oblique, flowers in dense globose silkily tomentose clusters, females very shortly peduncled. A. Hookeri, *var.* longifolia, *Meissn. in DC. Prodr.* xv. 1. 219. A. Hookeri, *Beddome For. Fl.* t. 296 (*excl. locality of Sikkim*).

DECCAN PENINSULA; on the Cuddepah Hills, *Wight, Beddome*.

Branchlets very robust, minutely but closely tomentose. *Leaves* 4–8 in a whorl, pale green when dry, youngest densely clothed with long golden silky hairs (as in *A. angustifolia*); midrib and nerves strong but not stout, orange-red; nervules very faint; petiole ⅓–½ in., stout. *Male fl.* ¼ in. diam.; lobes oblong, membranous, silkily hairy without, glabrous within. *Ovary* 0. *Fruit* not seen.—Beddome remarks that this is the only Laurineous plant of the Cuddepah Hills (except, I suppose, *Cassytha*); it is very near *A. angustifolia*, but the leaves are more obtuse, glaucous beneath, and the male fl. are much larger. Meissner describes the leaves as triple-nerved, but the lower pair are too short to admit of this.

9. **A. Hookeri**, *Meissn. in DC. Prodr.* xv. 1. 218 (*excl. var. γ.*); branchlets and young leaves densely softly rusty-tomentose or villous, leaves whorled penninerved (rarely subtriple-nerved) 5–8 in. coriaceous ovate- or elliptic-lanceolate finely acuminate glabrous or tomentose beneath, nerves 6–8 pair very slender, male fl. clustered, fem. umbelled or subracemose on a short stout peduncle, fruit ellipsoid seated on the much-thickened subcampanulate entire perianth-tube. A. angustifolia, *Nees*?; *Herb. Ind. Or. H. f. & T.*

The CONCAN and CANARA; on the Ghats, *Stocks, Law, Dalzell*.

Young leaves and branches almost woolly; buds large, silky. *Leaves* green when dry, sometimes 8 in. diam., smooth and often polished above, hardly glaucous beneath, and even when old then often rusty villous (var. *dasypoda*, Meissn.); petiole 1–1¼ in., always tomentose. *Flowers* silky; males very shortly pedicelled, ¼ in. diam.; fem.

fewer, longer pedicelled, umbels sessile or subracemose on a short peduncle. *Filaments* woolly. *Fruit* ⅓ in. long; perianth-cup as broad, thick; pedicel very stout, ¾–1 in. long.—Habit of *A. lanata*, but distinguished from all its Peninsular allies by the broad leaves ending in long points. It may, however, be a form of *angustifolia*, in which case *madraspatana* and *lanata* may be varieties of it. It is erroneously placed in the section *Notholitsea* in the Prodromus.

c. *Species of Ceylon.*

10. **A. molochina,** *Nees Syst. Laurin.* 603 (*excl. var. γ.*); leaves 1–3 in. whorled penninerved rigidly coriaceous elliptic obovate or cuneate-obovate obtuse shining above, beneath tomentose glabrous or glaucous, fem. fl. in simple clusters shortly pedicelled, fruit globose seated on the 6-fid perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 211; *Thwaites Enum.* 257; *Wight Ic.* t. 1843; *Beddome For. Man.* 186.

CEYLON; Central Province, alt. 6–8000 ft., *Walker*, &c.

A small tree, branches rather stout glabrous or scurfily tomentose. *Leaves* rarely orbicular, shining above, hard; nerves 4–6 pair, very prominent beneath, variable and sometimes triple-nerved on the same branch with the penninerved; petiole short, stout, rarely ¼ in. *Bracts* 9, outer smaller, 6-flowered. *Flowers* silky without, glabrous within; pedicel ⅛ in., stout. *Style* glabrous. *Fruit* "about ¼ in. diam." (*Thwaites*), seated on the scarcely enlarged perianth.—Meissner has two varieties, but their characters are found on the same branch, and many more as good might be made of this most variable species, the extremes of which would but for intermediates be regarded as distinct species.

Var. *Moonii*; leaves ovate or elliptic-lanceolate obtusely acuminate. A. Moonii, *Thwaites Enum.* 256 (not of Meissner).—Ceylon, alt. 5–7000 ft., *Moon, Sir G. McKenzie.*—Meissner, misled by a misplaced ticket of Thwaites, took a glabrous leaved form of *molochina* for this. The only specimens are very bad.

11. **A. stenophylla,** *Thwaites Enum.* 256; leaves 2–5 in. whorled penninerved coriaceous linear-oblong or -lanceolate obtuse quite glabrous glaucous beneath, nerves 10–15 pair, fem. fl. in simple clusters shortly pedicelled, fruit globose seated on the entire cup-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 212; *Beddome For. Man.* 186. A. Thwaitesii, *Meissn. l. c.*

CEYLON; in the Oova and Badulla districts, ascending to 3000 ft.

A tree, 20–30 ft.; branchlets glabrous or rusty-pubescent. *Leaves* 4–8 in a whorl, ⅓–½ in. broad, hardly shining above, midrib beneath stout, nerves usually very regular and slender; petiole ¼–⅓ in. *Bracts* subsilky and ciliate. *Flowers* many, in rounded clusters ⅛ in. diam., fulvous-silky. *Perianth-lobes* wholly deciduous. *Style* villous. *Fruit* ⅓ in. diam., black, pedicel ¼–⅓ in.—Small forms with leaves 1½ by ⅓ in. look very different, but are united by intermediates with the larger leaved.

12. **A. elegans,** *Thwaites Enum.* 256; leaves 2–4 in. whorled penninerved thinly coriaceous lanceolate or elliptic-lanceolate caudate-acuminate quite glabrous glaucous beneath, nerves 8–10 pairs very faint, fem. fl. in simple clusters very shortly pedicelled, fruit globose seated on the entire cup-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 212; *Beddome For. Man.* 186.

CEYLON; Central Province and Pasdoon Corle, ascending to 3000 ft., *Thwaites.*

A small tree; branches slender. *Leaves* 4–6 in a whorl, nerves very finely reticulated above almost evanescent, capillary beneath; petiole very slender, ¼–⅓ in. *Flowers* in subsolitary clusters, rusty-tomentose, ⅛ in. diam. *Perianth-lobes* wholly deciduous. *Filaments* villous. *Fruit* nearly ½ in. diam.; pedicel ¼ in.

13. **A. glauca,** *Nees Syst. Laurin.* 599; leaves 2–4 in. whorled penni-

nerved coriaceous elliptic-oblong rounded at both ends glaucous beneath minutely impressedly reticulate, nerves 6–8 pair very slender raised on both surfaces, male fl. large in sessile clusters stoutly pedicelled. A. glauca, β. Walkeri, *Meissn. in DC. Prodr.* xv. 1. 213.

CEYLON, *Walker.*

Branchlets petioles and strong midrib beneath rusty-tomentose. *Leaves* 4–6 in a whorl; petiole ½ in., stout. *Male fl.* ½ in. diam., tomentose, pedicels ¼ in. slender. *Bracts* about 14, 5-fid. *Perianth* villous without and at the base within. *Filaments* woolly at the base. *Ovary* and slender style glabrous.—This is the plant (the specimen indeed) described by Nees as *A. glauca*, and which Meissner referred to a variety of the *glauca* of Thwaites, which again is a different plant (my *pisifera*). Nees describes the leaves as glaucous above (no doubt a slip), and as "scrobiculo-reticulata," alluding to the impressed minute reticulation which in a less marked degree is not uncommon in the genus.

14. **A. pisifera,** *Hook. f.*; quite glabrous, branches slender, leaves 2–3 in. whorled penninerved elliptic-oblong obtuse impressed punctate on both surfaces glaucous beneath with 6–8 pairs of nerves, unopened clusters of flowers solitary sessile pisiform quite glabrous 5-fid. bracts eciliate. A. glauca, *Thwaites Enum.* 256; *Meissn. in DC. Prodr.* xv. 1. 213, *not of Nees*; *Beddome For. Man.* 186.

CEYLON; at Pedrotatagalla, alt. 7–8000 ft., *Thwaites* (C. P. 2536).

A tree, 30–40 ft. (*Thwaites*). *Leaves* in Thwaites' indifferent specimen thinly coriaceous, with recurved margins, base acute; petiole ⅓ in., very slender. *Unexpanded clusters* of flowers ⅛ in. diam., quite globose, pale, with about 14 perfectly glabrous bracts, the outer smallest. *Sepals* 6, substrigosely hairy in bud. *Filaments*, *ovary* and *style* quite glabrous.—This is quite distinct from *A. glauca* in the slender glabrous branches, and in the flower-buds, which are scattered like small peas along the branches, and by the glabrous eciliate bracts. *Stamens* young, but apparently quite glabrous. Thwaites describes the fem. fl. as 1½ line long, with the 2-line long pedicels rusty-hairy; the sterile stamens as spathulate, acute, glabrous, and the fruit as subglobose, on the slightly enlarged crenulate perianth. I have described from C. P. 2536.

†† Female flowers in peduncled umbels or clusters; or mixed, some pedicelled simply, others umbelled on peduncles in the same inflorescence. (See also *A. madraspatana*, *lanata* & *Hookeri*.)

15. **A. sesquipedalis,** *Hook. f. & Thoms. in Herb. Ind. Or.*; branches very robust tomentose, leaves whorled penninerved very coriaceous 1–2 feet linear or oblanceolate acute shining above subglaucous beneath, nerves 15–20 pair strong venules 0 or faint, fem. fl. solitary and umbellate on short peduncles in the same cluster, fruit globose on a broad flat entire or 5-crenate disk. Litsæa macrophylla, *Kurz For. Fl.* ii. 305 (*not of Blume*). Myristica sesquipedalis, *Wall. Cat.* 6809.

TENASSERIM; at Mergui, *Griffith.* PENANG, *Wallich.*

Branches as thick as the fore-finger, terete, smooth, finely pubescent, young villously hirsute. *Leaves* many in a whorl, 2–7 in. diam., dark brown and glossy above, the largest more membranous, base very acute, finely pubescent beneath, at length glabrous, surfaces not reticulate, midrib impressed above, but not the nerves; petiole very stout, ½–1 in. *Flowers* not seen. *Fruit* in clusters of 2 in. diam., globose, ⅔-1 in. diam., shining; peduncles and pedicels ½ in., very stout, hard, pubescent; disciform enlarged and thickened perianth hard, rugose outside, flat and smooth on the face.—Kurz has referred this to Blume's *Litsæa macrophylla*, which differs in the much smaller leaves not narrowed at the base and short petiole.

16. **A. Maingayi,** *Hook. f.*; branches very robust, leaves whorled

penninerved 1–2 feet very coriaceous oblanceolate or oblong-obovate subacute shining above rusty-tomentose beneath, nerves 15–20 pair very strong beneath with strong parallel transverse venules, fem. fl. solitary and umbellate on short peduncles in the same cluster, fruit globose on a broad flat 6-lobed perianth.

MALACCA, *Maingay* (*Kew Distrib.* 1275 and 1258, *sesquipedalis*).

Habit of *A. sesquipedalis*; leaves as large and of the same shape and texture, but tomentose beneath and barred between the nerves with strong parallel venules; the fruiting calyx is much smaller and less coriaceous and thick, the perianth-lobes persistent, and the globose black fruit is only ½ in. diam.

17. **A. pruinosa,** *Nees in Wall. Pl. As. Rar.* ii. 68, iii. 31, and *Syst. Laurin.* 591; branches slender, leaves whorled penninerved 3–5 in. coriaceous lanceolate or elliptic-lanceolate or oblanceolate caudate-acuminate smooth and shining above glaucous beneath, nerves 8–10 pair very slender, fem. fl. very small in peduncled umbels or clusters, fruit seated on the cupular-turbinate perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 216. Laurus pruinosa, *Wall. Cat.* 2581.

PENANG, SINGAPORE and MALACCA, *Wallich*, *Maingay*.

Branches rather slender, branchlets densely rusty-tomentose. *Leaves* 4–6 in a whorl, dark brown glossy and quite smooth above with the nerves obscure beneath, not reticulate, midrib red on both surfaces, finely pubescent beneath when young, glabrous in age; petiole ⅓–½ in., slender. *Flowers* ⅛ in. diam., silky, shortly pedicelled. *Style* slender, glabrous. *Fruiting perianth* ¼ in. diam., lobes deciduous; fruit not seen.

18. **A. angustifolia,** *Nees in Wall. Pl. As. Rar.* iii. 31, and *Syst. Laurin.* 594 (*excl. syn. Blume*); branches robust, leaves whorled penninerved 4–12 in. lanceolate oblanceolate or elliptic obtusely acuminate shining above young tomentose beneath, nerves 6–10 pair strong beneath very oblique, fem. fl. in peduncled umbels, fruit globose on a small cup-shaped entire perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 214; *Wight Ic.* t. 1841; *Miquel Fl. Ind. Bat.* i. 1. 967; *Beddome Fl. Sylvat.* t. 295, figs. 10, 11. ? A. heterophylla, *Blume Mus. Bot.* t. 342; *Meissn. l. c.* 214. Tetranthera angustifolia, *Wall. Cat.* 2559. T. caduca, *Herb. Ham.* Litsæa angustifolia, *Kurz For. Fl.* ii. 305. Laurus Gullawara, *Herb. Ham.*

ASSAM, *Hamilton*, *Jenkins*, SILHET and KHASIA MTS., alt. 1–2000 ft., *J. D. H. & T. T.*, *Clarke*. CHITTAGONG, *Clarke*. PEGU and TENASSERIM, *Wallich*, &c.—DISTRIB. Sumatra, Java.

A tree, branches rather robust, young softly tomentose. *Leaves* 4–6 in a whorl, very variable in length and breadth, glossy with slender raised nerves above, beneath glaucous or not, quite veinless between the strong nerves, villous when young; petiole ⅓–⅔ in. *Clusters* silkily villous; flowers ⅛ in. diam. *Style* villous. *Fruit* ⅓ in. diam. or less, cup ⅙ in. diam., pedicel about as long.—Judging from the leaf only, *A. macroptera*, Miquel, of Sumatra, is this. It a good deal resembles *A. Hookeri*.

19. **A. hirsuta,** *Hook. f.*; branchlets petioles and leaves beneath hirsute and brown-tomentose, leaves whorled penninerved 4–6 in. thinly coriaceous elliptic-lanceolate acuminate smooth and shining above, nerves 8–10 pair very slender, fem. fl. long-pedicelled umbellate or subracemose on a hirsute peduncle, fruit (young) seated on the cup-shaped quite entire perianth-tube.

MALABAR; at Quillon, *Wight*.

Apparently a very distinct species, in young fruit only, allied to *A. lanata* of the Nilghiris, but with broader (1½–2 in.) leaves densely tomentose beneath, and hirsute branches petioles and nerves beneath; the flowers too are long-pedicelled and umbellate; the common peduncle is ¼–½ in. long, and the pedicels rather longer.—Being found at Quillon, this is probably a coast species.

** Leaves in interrupted whorls, or the lower opposite, triple-nerved at the base, the lateral nerves reaching beyond the middle of the leaf.

20. **A. speciosa,** *Nees Syst. Laurin.* 602; branchlets stout and leaves beneath densely rusty-tomentose, leaves opposite and whorled triple-nerved long-petioled very thickly coriaceous orbicular rugose above, nerves 4–6 pair very strong beneath with strong cross-venules, clusters globose small silkily tomentose. *Meissn. in DC. Prodr.* xv. 1. 219; *Wight Ic.* t. 1842; *Thwaites Enum.* 257; *Bedd. For. Fl.* 187.

CEYLON; Central Province, ascending to 8000 ft.

A small tree, 30–40 ft.; branches very stout. *Leaves* 6–10 in. diam., 3–4 in a whorl and opposite, abruptly acuminate, base rounded or subacute, shining brown above with deeply impressed nerves and nervules, the former tomentose beneath almost velvety with rusty-brown hairs; petiole 1–2 in., very stout. *Clusters* of flowers ¾–1 in. diam.; pedicels very short. *Male perianth* ¼ in. diam.; tube very short; lobes glabrous within; fem. longer pedicelled. *Filaments* villous. *Style* woolly. *Fruit* "subspherical, seated on the enlarged truncate base of the perianth," *Thwaites.*

VAR. β. *Candolleana,* Thwaites l. c.; leaves less coriaceous more sparingly hairy ovate or oblong-lanceolate acuminate base acute. A. Candolleana, *Meissn. l. c.*—Central Province, at about 4000 ft., *Thwaites.*

21. **A. obovata,** *Blume Mus. Bot.* i. 342; branchlets and leaves rusty-pubescent, leaves whorled triple-nerved 10–18 in. long-petioled thinly coriaceous broadly elliptic-oblong or obovate acuminate smooth and shining above often glaucous beneath, nerves 3–4 pairs slender beneath, male fl. large clustered, fem. panicled, fruit ellipsoid seated on the thickened cupular entire perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 219. Tetranthera obovata, *Wall. Cat.* 2562. Tetradenia obovata, *Nees in Wall. Pl. As. Rar.* ii. 64. Litsæa obovata, *Nees Syst. Laurin.* 636. Laurus obovata, *Herb. Ham.*

SIKKIM HIMALAYA, alt. 1–2000 ft., *J. D. H., Clarke.* ASSAM, *Jenkins.* SILHET and KHASIA MTS., ascending to 3000 ft.—DISTRIB. Munnipore.

A small tree; branches stout. *Leaves* 4–12 in. diam., very variable in size and shape, largest often quite membranous, rarely elliptic-lanceolate; petiole 1–2 in. *Male fl.* ½ in. diam., tube very short, lobes membranous; fem. much smaller, but longer pedicelled. *Style* glabrous. *Fruit* ⅔–1 in. long; cup dilated, ⅓–½ in. diam., turbinate; pedicel very stout, ¼ in. long.

22. **A. ambigua,** *Hook. f.*; nearly glabrous, leaves subverticillate 1½–3 in. orbicular or broadly oblong (rarely oblong-lanceolate) obtuse or tip rounded triple-nerved glaucous beneath margins recurved, umbels 4–6-fld. sessile solitary or clustered, bracts 6–8, fruit ellipsoid subovoid or subglobose. A. molochina, γ. subtriplinervis, *Meissn. in DC. Prodr.* xv. 1. 211. Litsæa ambigua, *Meissn. l. c.* L. zeylanica, *var. β., Thwaites Enum.* 257, *in part.* L. orbicularis, *Thwaites Enum.* 258; *Meissn. l. c.* 222 (C. P. 2699, 3155, 2280, 72, 2278).

CEYLON; Ambagamowa district and Central Province, alt. 4–7000 ft., *Gardner, Thwaites.*

A small tree; branchlets usually black, "brown-tomentellous," *Thwaites.* *Leaves* very rigidly coriaceous, pale brown, convex above and shining with 6–8 pair of impressed nerves, glaucous (white and pruinose, *Thwaites*) beneath with rather slender nerves, the 2 basal reaching about the middle of the leaf, base rounded or acute rarely cordate; petiole ¼–⅓ in. (and midrib hairy at the base, *Thwaites*). *Umbels,* unopened globose, $\frac{1}{8}$–$\frac{1}{4}$ in. diam., scattered along the branches and axillary; bracts hard, strongly ciliate, outer smaller glabrous, inner hemispheric rusty silkily hairy; flowers pedicelled, $\frac{1}{8}$ in. diam., and pedicel silkily tomentose. *Sepals* 4–6, oblong. *Stamens* 6–9, filaments short. *Fruit* about $\frac{1}{2}$ in. long.—A very distinct species, strangely mixed up with others by Thwaites and Meissner. I have adopted Meissner's specific name as the orbicular-leaved state is quite exceptional, and it is certainly not a *Litsæa*. Meissner's var. *β. lanceolata* is a narrower leaved form.

*** Leaves scattered or alternate more or less triple-nerved.

23. **A. confertiflora,** *Meissn. in DC. Prodr.* xv. 1. 219; glabrous, leaves alternate 5–7 in. coriaceous orbicular-ovate or -oblong acute or obtuse triple-nerved and with 3–4 pair of strong superior nerves, pale or subglaucous beneath and delicately reticulate, flowers very numerous long-pedicelled in dense axillary subsessile fascicled clusters, bracts not seen.

EASTERN HIMALAYA; Bhotan, near Dewangiri, alt. 2–3000 ft., *Griffith* (*Kew Distrib.* 433).

Branches stout, black when dry, smooth. *Leaves* 3–4 in. broad, pale brown and shining above, with slender raised nerves; paler beneath with very strong nerves, of which the two lower pair are penninervuled towards the margin of the leaf; base acute; petiole $\frac{3}{4}$–1 in. long. *Flowers,* unexpanded $\frac{1}{8}$ in. diam., globose, glabrous, or nearly so; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in.; common peduncle $\frac{1}{10}$ in., scarred by the fallen bracts. *Sepals* rounded, concave, coriaceous. *Filaments* glabrous, anthers short. *Ovary* subglobose, with three lateral furrows, a subulate style and acute stigma. *Fruit* unknown.—The ovary is remarkable for the genus.

24. **A. leiantha,** *Hook. f.*; glabrous except the rusty-tomentose inflorescence, leaves scattered 5–9 in. coriaceous subtriple-nerved lanceolate acute or subacute, nerves 6–8 pair beneath subglaucous not reticulated, flowers in axillary and infra-axillary racemes which when young are clothed with imbricate rounded silky caducous bracts. Litsæa leiantha, *Kurz For. Fl.* ii. 305.

TENASSERIM (or Andaman Islands), *Helfer* (*Kew Distrib.* 4330).

Branches black, bark smooth. *Leaves* brown when dry, 2–2$\frac{1}{2}$ in. diam., rigid, margins undulate, base acute, shining above with raised nerves, beneath glaucous when young, lowest pair of nerves longest, $\frac{1}{4}$–$\frac{1}{3}$ the length of the leaf; petiole 1–1$\frac{1}{2}$ in., slender. *Flowers* $\frac{1}{4}$ in. diam., clusters arranged on an erect raceme 1–2 in. long; rachis slender, nearly glabrous; pedicels short; bracts $\frac{1}{4}$ in. diam., coriaceous. *Perianth* villous within at the base; segments concave. *Filaments* and anthers short. *Ovary* and style slender glabrous, stigma discoid. *Fruit* unknown.—The foliage resembles that of *A. sphærocarpa* of Java, in which the flowers are umbelled. The racemose inflorescence is unique in the genus.

DOUBTFUL SPECIES.

ACTINODAPHNE sp., South Andaman, *Kurz in Herb. Calcutt.*; branches very stout and petiole and midrib above and beneath brown-tomentose, leaves whorled penninerved 12–18 by 4–7 in. oblong-lanceolate acuminate shining above glaucous and reticulate beneath, nerves 12–15 pair and cross nerves impressed above raised beneath, petiole stout 1–1$\frac{1}{2}$ in.

ACTINODAPHNE sp. Beddome in his Forest Manual (187) alludes to a new and fine species called Nattee as forming a lofty tree in the South Canara Ghats.

ACTINODAPHNE? from Seetakoond, near Chittagong, *Clarke*; a plant very like *A. leiantha,* having similar racemose inflorescence. *Branches* slender and leaves glabrous. *Leaves* scattered triple-nerved, thinly coriaceous, 3–5 in., elliptic or elliptic-lanceolate, obtusely caudate-acuminate, narrowed into a very long slender petiole $\frac{1}{2}$–1$\frac{1}{2}$ in., impressed punctate on both surfaces, subglauceus beneath, lower pair of nerves very long, others few or 0. *Racemes* $\frac{1}{2}$–1 in., solitary or 2-nate, erect, simple or compressed, formed of globose clusters of 3-5 flowers enclosed in 6-8 subsilkily pubescent rounded concave bracts; peduncle of raceme slender, with a few small scales. *Flowers* too young to analyze.—This may be a *Lindera*, for the inflorescence somewhat resembles that of *L. caudata*; or possibly a *Litsæa* of the section *Neolitsæa*.

11. LITSÆA, *Lamk.* (TETRANTHERA, *Jacq.*)

Evergreen, rarely deciduous trees or shrubs. *Leaves* alternate, rarely opposite or subopposite, penninerved, rarely triple-nerved, leaf-buds naked or scaly. *Flowers* diœcious, umbellate; umbels 4–6- rarely more-flowered, sessile or pedicelled; pedicels clustered rarely solitary, axillary or on the leaf-scars, sometimes racemose or fascicled on a common peduncle; involucral bracts 4–6, rarely more, concave, coriaceous or membranous. *Perianth-tube* ovoid campanulate or very short; lobes or segments 6–4, rarely more or fewer, equal or unequal, or in a few wanting. *Stamens* 6, 9, 12, rarely more or fewer; filaments of 1st and 2nd series usually eglandular, of the 3rd (and 4th if present) 2-glandular; anthers all introrse, 4-celled. *Fruit* a drupe or succulent, seated on the often greatly enlarged perianth-tube.—Species about 140, Tropical and Eastern Asia, Australasia, the Pacific Islands, rare in Africa and America.

After many weeks of study I am unable to offer a satisfactory account of the Indian Litsæas, flower of one or other sex and fruit of most being wanted to determine their affinities and formulate the diagnoses of the species. The sections *Conodaphne* and *Cylicodaphne* pass into one another, and cannot be distinguished without ripe fruit, which is wanting in two-thirds of the plants referred by Meissner to the first of these sections. Blume's section *Tomingodaphne*, if confined to the deciduous leaved species, may, I think, be retained.

It is to be borne in mind that neither Nees nor Meissner cites Roxburgh's "Flora Indica;" as also that Roxburgh adopted different names for the same plant in his "Flora," in his unpublished "Icones," and in the Calcutta Bot. Garden. I have been very cautious in identifying Indian species with Malayan, for want of better specimens of the latter. I think it probable that sect. *Neolitsæa* will be restored to generic rank, as *Tetradenia*, from its habit and floral characters.

Sect. I. **Tomingodaphne,** *Blume.* *Leaves* deciduous, alternate, penninerved, terminal buds usually perulate (clothed with imbricate chartaceous scales. *Perianth-segments* 6; tube not enlarged in fruit.—Mountain species, of 5–11,000 feet elevation.

* *Terminal buds naked.*

1. **L. citrata,** *Blume Bijd.* 565; quite glabrous, branches black when dry, leaves 5–7 in. deciduous alternate long-petioled penninerved membranous greenish when dry lanceolate caudate-acuminate glaucous beneath, nerves 12–15 pair very slender, umbels solitary or corymbose on a very short peduncle 4–10-fld., pedicels very slender, fruit small globose, perianth-base not enlarged. Tetranthera citrata, *Nees Syst. Laurin.* 560; *Blume Mus. Bot.* i. 385; *Miquel Fl. Ind. Bat.* i. 958. T. polyantha, *Wall. Cat.* 2538; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 545; *Meissn. in DC. Prodr.* xv. 1. 182 (*including β. citrata, but excluding China as locality*); *Kurz For. Fl.* ii. 301.

EASTERN HIMALAYA; from Sikkim to Mishmi, alt. 5–9000 ft. KHASIA MTS., alt. 5–6000 ft. AVA, *Kurz.*—DISTRIB. Java.

A deciduous bush or small tree, with a delightful fragrance of oranges; branches slender, quite smooth; terminal bud naked. *Leaves* the most membranous of the genus, bright green above, dull glaucous beneath, youngest silky; nerves variable, from nearly horizontal or obliquely ascending, base acute; petiole ½–1 in., very slender. *Umbels* ½ in. diam.; bracts membranous, not in decussating pairs, glabrous or sparsely silky; flowers with usually villous white pedicels; males about ⅛ in. diam., with an abortive ovary; females smaller, stamens imperfect, stigma disciform. *Sepals* membranous, obovate, subequal. *Stamens* 9–10 in the male, 3 of them 2-glandular; filaments usually hairy; anthers quadrate. *Fruit* ¼–⅓ in. diam.—This is not the *L. citrata* of Hong Kong.

2. **L. Kingii**, *Hook. f.*; quite glabrous, branches black when dry, leaves 3–4 in. alternate deciduous penninerved short-petioled thinly coriaceous greenish when dry elliptic-lanceolate acute glaucous and reticulate beneath, nerves 12–18 pair very slender and spreading, umbels solitary or few and corymbose stoutly pedicelled recurved in bud 5-fid., fruit small globose, perianth-base not enlarged. L. citrata, *Herb. Calcutta, in part.* Tetranthera No. 5, *Herb. Ind. Or. H.f. & T.*

SIKKIM HIMALAYA, alt. 6–8000 ft., *J. D. H.*, *King*, *Clarke*. KHASIA MTS., *Griffith.*

A deciduous bush, with a delightful spicy fragrance; branches stout, quite smooth; terminal buds with the young leaves quite glabrous and convolute (like a lanceolate or perulate bud). *Leaves* thin but firm in texture, shining and reticulate above, with pale nerves, base acute; petiole ⅓–½ in. *Umbels* ⅓ in. diam.; bracts 4–5, quite glabrous, not decussately opposite; flowers with short quite glabrous pedicels; males about ⅛ in. diam. *Sepals* 6, oblong, unequal. *Stamens* 8–12, 4 or 6 2-glandular; filaments glabrous. *Ovary* minute; female in smaller fewer-fid. umbels; perianth more irregular; stigma discoid. *Fruit* ¼ in. diam.—Closely allied to *L. citrata*, but quite distinct in the stouter branches, more elliptic acute leaves, short petioles, and much stouter pedicels of the umbels.

** *Terminal buds perulate.*

3. **L. sericea**, *Wall. Cat.* 2545 (Tetranthera); branches black when dry, terminal buds perulate, leaves 3–4 in. alternate deciduous penninerved subcoriaceous oblong-lanceolate base acute softly tomentose and reticulate beneath, nerves slender 10–12 pair, umbels solitary very shortly pedicelled 8–20 fid., bracts 4 caducous, fruit long-pedicelled small subglobose on the very small flat perianth-tube. Tetranthera sericea, *Wall.*; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 565; *Blume Mus. Bot.* i. 376. T. sericea and T. sikkimensis (*excl. syn. T. elongata and hab. Khasia*), *Meissn. in DC. Prodr.* xv. I. 181.

TEMPERATE HIMALAYA, alt. 9–11,000 ft.; from Nepal, *Wallich*, to Bhotan, *Griffith.*—DISTRIB. Munnipore.

A small very aromatic tree, sometimes 50 ft. high; bud-scales rigid, outer short obtuse, innermost long, lanceolate, acuminate; branches robust. *Leaves* pale brown when dry, young clothed with fulvous brown silky shining tomentum, base very acute; petiole ¼ in., tomentose. *Umbels* nearly 1 in. diam., on very short tomentose peduncles; bracts glabrous; flowers pedicelled, ⅛ in. diam. *Sepals* 6, rounded, hairy at the base within. *Stamens* 12, short, filaments hairy; anthers broad, square; glands very large. *Ovary* ovoid, style stout, stigma very large. *Fruit* ¼ in. long, pedicels ¾–1 in. long.

4. **L. oreophila**, *Hook. f.*; quite glabrous, branches rather slender, leaves alternate penninerved deciduous ovate-lanceolate acuminate finely reticulate on both surfaces, nerves 8–10 pair very slender, umbels solitary pedicelled ovoid in bud and mucronate 6-fid., bracts 4 broadly ovate acute cucullate glabrous, flowers tomentose. Lindera Hookeri, *Meissn. in DC. Prodr.* xv. I. 245.

SIKKIM HIMALAYA; Lachoong Valley, alt. 10–11,000 ft., *J. D. H.*

A bushy tree, branches terete; buds scaly, glabrous. *Leaves* 2-3 in., rather membranous, greenish when dry, not glaucous beneath, base rounded or cuneate; petiole ⅓ in., very slender. *Umbels* in bud ¼ in. long, erect on a rather stout pedicel ⅓ in. long. *Flowers* very young, ♀?, filaments villous; anthers 4-celled.—Meissner describes this as a *Lindera*, but I find that I many years ago made a note that the anthers are 4-celled, and on a second examination I am confirmed in this. I am not positive as to the leaves being deciduous, judging from appearance only.

Sect. II. **Eulitsæa,** *Benth.* *Leaves* persistent, alternate, penninerved: *Perianth-segments* very incomplete or 0, tube not or slightly enlarged in fruit. *Stamens* often more than 12.

5. **L. tomentosa,** *Herb. Heyne, ex Wall. Cat.* 2550; densely softly tomentose except the leaves above, leaves 3-7 in. alternate penninerved coriaceous elliptic or oblong obtuse acute or acuminate, nerves 8-10 pair, umbels large solitary many-fld., perianth incomplete or 0, fruit globose on the small thickened perianth-tube. Tetranthera tomentosa, *Roxb. ex Wall. Cat. l. c.* A, B; *Meissn. in DC. Prodr.* xv. 1. 177 (*excl. habitat of Sirmore and citat. of Nees*); *Wight Ic.* t. 1834; *Kurz For. Fl.* ii. 297 (*description only*). T. apetala, *Dalz. & Gibs. Bomb. Fl.* 222. T. japonica fem., *Herb. Wight.* Laurineæ, *Wall. Cat.* 7455.

DECCAN PENINSULA; on the Western Ghats, from the Concan southwards. CEYLON; Central Province, ascending to 4000 ft.

An evergreen tree; branchlets stout. *Leaves* pale when dry, finely reticulated above, laxly beneath, base acute or rounded; petiole ¼–½ in. *Umbels* ½–⅔ in. diam.; pedicel as long, stout; bracts 4, tomentose on both surfaces; flowers very shortly pedicelled. *Stamens* 18-20, filaments long, slender, villous; glands long-pedicelled. *Fruit* ½ in. diam.—Griffith's Mergui plant, and Wallich's 2550 C (not A as quoted by Meissner), are flowerless specimens of *L. sebifera*, as is probably Meissner's var. β.? *birmanica*, which I have not seen. Kurz, who introduces the latter in his Forest Flora on Meissner's authority, never saw it. I have no idea what Gamble's *T. tomentosa* from Sikkim, alt. 6-8000 ft., is (Man. Ind. Timb. 310); his Birman *T. tomentosa* is doubtless *L. sebifera*, var. *tomentosa*. Wallich's lithographed ticket, "No. 7455, *Laurin.*," is attached to a sheet without a specimen; but another sheet, also marked 7455 in pencil, contains a specimen of *L. tomentosa*.

6. **L. sebifera,** *Pers. Syn.* ii. 4; glabrous or tomentose, leaves alternate 3-9 in. coriaceous or chartaceous elliptic ovate or oblong, tip acute obtuse or rounded, nerves 8-10 pair, umbels corymbose or racemose usually long-pedicelled few- or many-fld., perianth very incomplete or 0, fruit globose on the small thickened perianth-tube.

Throughout the hotter parts of INDIA, from the PANJAB and lower HIMALAYA at GARWHAL, eastwards to SIKKIM, ASSAM and the KHASIA MTS., the GANGETIC PLAIN and BENGAL; and southwards to MALACCA and throughout the DECCAN PENINSULA. CEYLON, ascending to 3000 ft.—DISTRIB. Malay Islands, China, Australia (introd. in Mauritius).

An evergreen tree, 20-50 ft., of protean habit foliage and inflorescence. *Leaves* subterminal on the branches, pale when dry; petiole ⅓–1 in. *Umbels* few or many, ¼–⅔ in. diam.; pedicels clustered on a stout or slender common peduncle ¼–3 in. long; bracts 4, more or less tomentose. *Stamens* 9-20 or more, filaments more or less villous. *Fruit* the size of a pea, pedicel sometimes thickened.—I recognize three principal forms of this variable plant: 1, leaves usually thin, glabrous or nearly so, often small, oblong, tip rounded; 2, leaves much larger, more pubescent beneath, and more or less acute; 3, leaves large, ovate or oblong, acute, thickly tomentose beneath or on both surfaces (as in states of *L. tomentosa*, for which flowerless specimens have been taken by Nees and Meissner). The varieties proposed by Blume and Meissner may be grouped as follows. I am compelled to query Jacquin's plate of *laurifolia*, which represents the perianth of 6 equal lobes toothed at the tips; which is totally unlike anything I have met with in the large suite of specimens examined.

Var. 1. *L. sebifera* proper; leaves 3–6 in. thin oblong glabrous above sparingly pubescent beneath. L. sebifera & tetranthera, *Pers. Synops.* ii. 4. L. multiflora, *Blume Bijd.* ii. 564. L. chinensis, *Lamk. Dict.* iii. 574. Tetranthera laurifolia, multiflora, racemoso-umbellata & Roxburghii, *Blume Mus. Bot.* ii. 373, 374, and including Var. *Jacquinii*, *Meissn. in DC. Prodr.* xv. 1. 178, 179. T. laurifolia (? *Jacq. Hort. Schoenb.* i. 59, t. 113); *Roxb. Fl. Ind.* iii. 823; *Bot. Reg.* t. 893; *Blume Mus. Bot.* i. 372; *Wall. Cat.* 2555 A, D; *Brand. For. Fl.* 319; *Gamble Man. Ind. Timb.* 310. T. Roxburghii, *Nees in Wall. Pl. As. Rar.* ii. 65 and iii. 30, and *Syst. Laurin.* 515; *Thwaites Enum.* 255. T. apetala, *Roxb. Cor. Pl.* ii. 25, t. 147, and *Fl. Ind.* iii. 819; *Gærtn. f. Fruct.* iii. 226, t. 222; *Wall. Cat.* 2554 B, C. T. capitata, *Herb. Roxb.* Tomex tetranthera & sebifera, *Willd. Sp. Pl.* ii. 839, 840. Sebifera glutinosa, *Lour. Fl. Coch.* ii. 783. Laurus involucrata, *Kœnig in Retz. Obs.* vi. 27. Gaja nippeli, *Jones in Asiat. Res.* iv. 303.—Widely distributed.

Var. 2. *glabraria*; leaves usually larger more ovate and acute usually more tomentose beneath. L. glabraria & lævis, *Juss. in Ann. Mus.* vi. 212. L. geminata, *Blume Bijd.* 564. L. platyphylla, *Pers. Synops.* Tetranthera geminata, glabraria & platyphylla, *Nees Syst. Laurin.* 559, 569, 570. T. citrifolia & tersa, *Spreng. Syst. Veg.* ii. 266, 267. T. apetala, *Wall. Cat.* 2554, *in part.* T. polycephala, *Wall. mss.* T. laurifolia, *Nees in Wall. Pl. As. Rar.* ii. 66 and iii. 30, and *Syst. Laurin.* 519; *Benth. Fl. Austral.* v. 305. T. litoralis, *Blume Mus. Bot.* i. 375, and *β.* glabrescens, *Meissn. in DC. Prodr.* xv. 1. 180. T. laurifolia, *vars.* citrifolia, platyphylla & attenuata, *Blume l. c.* 374, and (*including var.* longifolia) *Meissn. l. c.* 179. Glabraria tersa, *Linn. Mant.* 276. G. tersa & litoralis, *Miquel Fl. Ind. Bat.* i. 941, 943.—Widely distributed.

Var. 3. *tomentosa*; leaves ovate or oblong acute and branches densely] softly tomentose on both surfaces or sparingly above. Tetranthera tomentosa, *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 511 (*not of Roxb.*). T. laurifolia? *Wall. Cat.* 2550 C.—Western Himalaya; Sirmore, *Wallich*; Kumaon and Garwhal, alt. 2–3000 ft. Birma and Tenasserim, *Wallich*, &c.—Except by the compound umbels this is undistinguishable from *L. tomentosa*, and favours the view taken by Dalzell and Gibson, that *tomentosa* and *sebifera* are forms of one species.

7. **L. ligustrina,** *Nees in Wall. Pl. As. Rar.* ii. 65, and *Syst. Laurin.* 513, 677 (Tetranthera); glabrous or the shoots pubescent, leaves 3–4 in. persistent alternate penninerved shortly petioled elliptic oblong or obovate obtuse or acute shining and reticulated above, nerves 6–8 pair, umbels solitary or clustered many-fld., bracts glabrous, perianth very incomplete or 0. Tetranthera ligustrina, *Nees*; *Meissn. in DC. Prodr.* xv. 1. 180; *Wight Ic.* t. 1835; *Wall. Cat.* 2555 C, E. T. celastroides; *Miq. in Pl. Hohenack.* n. 1336.

DECCAN PENINSULA; on the Ghats, from the Nilghiri Hills and southward.

A bush or small tree, similar at first sight to states of *L. sebifera*, but more glabrous, leaves always small, with very fine reticulation above, shorter petioles rarely ½ in., and simple umbels, with slender pedicels and glabrous bracts. *Filaments* villous. *Fruit* not seen.—The Ceylon plant referred here by Thwaites is the following.

8. **L. undulata,** *Hook. f.*; branchlets petioles and inflorescence hoary-pubescent, leaves 3–6 in. alternate penninerved coriaceous linear-oblong obtuse glabrous except the midrib beneath, margins waved, umbels solitary and clustered stoutly pedicelled, bracts pubescent, perianth very incomplete. Tetranthera ligustrina, *Thwaites Enum.* 254, *not of Nees.*

CEYLON; in the Central Province, *Walker*, *Macræ.*

Branches robust. *Leaves* 1–1½ in. broad, shining and not reticulated above, pale grey-brown beneath, nerves 10–12 pair, slender; petiole ½–¾ in., at length glabrous. *Umbels* globose, ⅓–½ in. diam.; pedicels ⅓ in. *Stamens* villous. *Fruit* not seen.—Possibly a form of *L. ligustrina.*

9. **L. membranifolia,** *Hook. f.*; branches stout, shoots petioles leaves beneath and umbels hoary-pubescent, leaves 8–12 by 4–6 in. alternate penninerved very membranous oblong-obovate obtuse or apiculate green when dry hardly glaucous beneath, nerves 10–14 pair slender, cross nervules strong beneath, umbels solitary large long-pedicelled, bracts 4 hoary, flowers numerous pedicelled, perianth incomplete.

UPPER ASSAM; Mishmi Hills, and woods at Yen, *Griffith* (*Kew Distrib.* 4310).

A medium-sized tree; bark of branches smooth, red-brown. *Leaves* with cuneate bases, obscurely pubescent between the nerves, very thin. *Umbels* (flowering) 1 in. diam.; pedicel as long, slender; flowers and pedicels villous. *Sepals* 3 or more, unequal, small. *Filaments* very slender, ¼ in. long, sparsely villous.—Possibly an extreme form of *L. sebifera*, but most dissimilar.

Sect. III. **Conodaphne,** *Blume. Leaves* persistent, alternate or opposite, penninerved. *Perianth-segments* usually 6, equal or subequal, rarely unequal; tube not or slightly enlarged in fruit, except *L. Blumii.* (The fruit and fruiting perianth-tube are known in very few species referred to this section by Blume and Meissner. Some of the following are possibly referable to Sect. Cylicodaphne.)

* *Leaves opposite or subopposite (sometimes alternate on the same specimen).*

10. **L. lancifolia,** *Roxb. ex Wall. Cat.* 2532 (Tetranthera) (*not T. lanceæfolia of Fl. Ind.*); branches slender finely tomentose, leaves opposite and alternate 3–8 in. thin shortly petioled penninerved oblong or elliptic-oblong or -lanceolate acute or acuminate glaucous beneath, nerves 6–8 pair, umbels few small in usually very shortly pedicelled clusters villously tomentose, bracts 6 3-fid., fruit globose on the very minute flat perianth-tube. T. lancifolia, *Roxb.*; *Nees in Wall. Pl As. Rar.* ii. 65, and *Syst. Laurin.* 509; *Meissn. in DC. Prodr.* xv. 1. 194; *Miquel Fl. Ind. Bat.* i. 944 (*excl. var. ε. and syn. Roxb. Fl. Ind.*). T. chrysantha and T. pusilla, *Blume Mus. Bot.* i. 376. T. attenuata, *Wall. Cat.* 2534, *in part.*

TROPICAL EASTERN HIMALAYA; from Bhotan to Mishmi, *Griffith.* SILHET and KHASIA MTS., ascending to 3000 ft., *Wallich*, &c. TENASSERIM, *Griffith*, &c.—DISTRIB. Borneo.

A bush or small tree; pubescence grey or rusty. *Leaves* very variable in size, drying grey or red-brown, not coriaceous, young finely tomentose beneath, smooth above with impressed nerves, nervules faint beneath; petiole ⅒–⅛ in. *Clusters* ¼ in. diam.; umbels very small and shortly pedicelled, in bud ⅛ in. diam.; flowers ⅒ in. diam. *Sepals* very unequal, villous. *Stamens* about 6, usually shorter than the sepals, but very unequal. *Fruit* ¼ in. diam., apiculate.—Meissner's vars. *glaucophylla*, *pusilla*, *borneensis* and *alternifolia* offer no constant characters; his var. ε. appears to be *L. oblonga.*

Var. *pedicellata*; pedicels very slender ¼ in. long, branches less tomentose.—Tenasserim or Andaman Islands, *Helfer* (*Kew Distrib.* 4306).

Var. *alternifolia*, Meissn. l. c.; leaves mostly alternate more glabrous.—Sikkim Himalaya, *J. D. H.* (*Herb. Ind. Or.*, *Tetranthera*, No. 15).

11. **L. gracilipes,** *Hook. f.*; quite glabrous, leaves opposite and subopposite 4–5 in. penninerved thinly coriaceous pale elliptic- or oblong-lanceolate acute or subacute smooth above beneath obscurely reticulate and

when dry with close impressed points, nerves 5–7 pair very slender and oblique, umbels few in a cluster 3–4-fld. pedicel filiform.

MALACCA, *Griffith* (*Kew Distrib.* 4311).

Branchlets slender; bark brown, smooth. *Leaves* 1¼–1½ in. broad, nerves above very obscure; base very acute; petiole ¼–⅓ in. *Umbels* (male) about ¼ in. when expanded; pedicels ⅓–½ in.; bracts 4, minutely puberulous, as are the sessile flowers. *Sepals* 4–6, spathulate, membranous, ciliate. *Stamens* 10, filaments slender, glabrous; anthers short. *Ovary* 0. *Perianth-tube* after flowering (when $\frac{1}{12}$ in. long) clavate, truncate, with a contracted mouth.—A very distinct plant, of which more specimens are much wanted. The leaves are attacked by a species of fungus like that of *L. chartacea.* The pedicels of the umbels do not seem to thicken after flowering, but they are too young to judge from.

12. **L. Blumii,** *Nees in Wall. Pl. As. Rar.* ii. 65; branches stout and leaves beneath and umbels rusty-tomentose, leaves opposite 6–12 in. penninerved rigidly coriaceous linear-oblong obtuse or acute smooth above obscurely reticulate beneath with 8–15 pair of very strong arched nerves, umbels many clustered very shortly pedicelled 6–8 fld., fruit ellipsoid half sunk in the large hemispheric truncate quite entire warted very shortly pedicelled perianth-tube. L. ferruginea, *Blume Bijd.* 561. Cylicodaphne ferruginea, *Meissn. in DC. Prodr.* xv. 1. 207. Actinodaphne Blumii, *Nees Syst. Laurin.* 598. Tetranthera fulva, β. rigida in part, *Meissn. l. c.* 195. Lepidadenia ferruginea, *Miq. Fl. Ind. Bat.* i. pt. 1, 935.

MALACCA, *Griffith, Maingay,* &c.—DISTRIB. Java.

A tree; branches rather stout. *Leaves* very rarely subopposite, 2–3½ in. diam., above smooth, usually yellow-green with faintly-impressed nerves and recurved margins, base acute or cuneate; petiole ⅓–1 in. *Umbels* (female) ⅓ in. diam. when expanded; bracts 4, coriaceous; flowers small, tomentose. *Sepals* oblong, densely silky-tomentose. *Stamens* (in sketch in Wight's Herb. from Griffith's specimens) 12, all imperfect, hairy, of 1st and 2nd row hairy, 2-glandular with the anthers produced into a ligula. *Ovary* with a slender erect style and lobed stigma. *Fruit* 1 in. long; cup of perianth ⅔ in. diam., edge of mouth acute.—That this is *Litsæa ferruginea* of Blume is nearly certain from comparison with a named specimen from Blume in the Hookerian Herbarium. Meissner describes the fruit as globose and the perianth-tube as flat with a torn margin, characters foreign both to Miquel's description of the fruit, and to that of the Malaccan plant. The species is omitted in Blume's revision of the Litsæas, &c., in Mus. Bot. Lugd. Bat.

13. **L. sessiliflora,** *Hook. f.*; branches stout and leaves beneath and inflorescence rusty-tomentose, leaves 8–12 in. opposite penninerved very shortly petioled oblong-lanceolate acuminate rugose above, nerves 16–20 pair very strong beneath with raised cross-nervules, umbels axillary sessile 3-fld., flowers sessile, perianth villous, fruit small globose seated on the persistent 6-lobed perianth.

PENANG; on Government Hill, *Maingay.*

A tree, 10 feet high (Maingay); branchlets as thick as a goose-quill, densely tomentose. *Leaves* bifarious, coriaceous, rusty-brown, above glabrous except the tomentose midrib with deeply sunk nerves, beneath red brown; petiole ⅛ in., very stout. *Umbels* appressed to the axils, solitary or crowded, ¼ in. diam.; bracts 4, scarious, villous. *Sepals* subequal, obtuse. *Stamens* 9, shorter than the perianth; filaments short, villous, 3 inner 2-glandular; anthers short. *Ovary* and style glabrous. *Fruit*, young size of a pea, seated on the stellate perianth.—A very remarkable species, with the habit of *L. Blumii*, but a very different fruit and with rugose leaves.

** *Leaves alternate, glabrous beneath or nearly so.*

14. **L. Wallichii,** *Hook. f.*; quite glabrous, leaves alternate 4–18 in.

penninerved thinly coriaceous elliptic-oblong-ovate or -lanceolate acuminate exquisitely reticulate on both surfaces subglaucous beneath, nerves strong 4–6 pair, umbels axillary solitary or clustered, bracts membranous glabrous 4-fld., stamens glabrous, fruit small ovoidly globose on the persistent 6-lobed perianth. Lindera nervosa, *Kurz For. Fl.* ii. 308. Tetranthera chartacea ?, *Wall. Cat.* 2531 B. T. chartacea, β. ? nervosa, *Meissn. in DC. Prodr.* xv. 1. 186 and 513. Laurin., *Wall. Cat.* 7531, *the right-hand specimen.*

EASTERN TROPICAL HIMALAYA; Bhotan, *Griffith* (*Kew Distrib.* 4290). BURMA; at Amherst, *Wallich.* ARRACAN and TENASSERIM, *Kurz*, &c.

A tree; branches quite smooth. *Leaves* coriaceous, but flexible, shining, pale brown or greenish above when dry, largest 20 by 9 in., the reticulations between the nerves extremely fine, base acute obtuse or (in Bhotan specimens) rounded; nerves beneath slender but prominent, often reddish, petiole ½–¾ in. *Umbels* few, ¾ in. diam., pedicel ½–¾ in.; bracts caducous; male flowers small, glabrous within and without, subsessile. *Sepals* oblong. *Stamens* 9, 3 inner 2-glandular, anthers oblong. *Ovary* 0 or imperfect, with a slender style and small stigma. *Fruit* ⅓ in. long, pedicel ⅒ in., thick.—A very handsome species.

15. **L. mishmiensis,** *Hook. f.*; branches black and leaves quite glabrous, leaves 4–6 in. alternate penninerved long-petioled thinly coriaceous oblong-lanceolate acuminate base acute smooth above pale brown beneath, nerves 12–16 pair very slender, umbels solitary axillary and on short leafy branches long-pedicelled 10–15-fld., bracts caducous and long-pedicelled flowers pubescent or tomentose.

UPPER ASSAM; Mishmi Hills at Laim-Planj-thaya, *Griffith.*

A large tree, branches smooth; buds silkily tomentose. *Leaves* 1½–2 in. diam., not rigid, faintly irregularly reticulated beneath; petiole slender, ⅓–⅔ in. *Umbels* ⅓–½ in. diam.; pedicel ⅓ in., pubescent, not stout; bracts 4–5, very concave, coriaceous; pedicels of flowers ⅙–¼ in., and base of male perianth white-tomentose. *Sepals* 6, small, oblong. *Stamens* 9, 3 inner 2-glandular; filaments short, glabrous, anthers square. *Ovary* minute; style slender, stigma small. *Fruit* unknown.—Quite unlike any other species in the long pedicels of the male flowers, whence the inflorescence resembles a *Lindera.*

16. **L. assamica,** *Hook. f.*; branches and leaves glabrous or the latter faintly puberulous beneath, leaves 4–6 in. alternate penninerved thinly coriaceous greenish when dry very shortly petioled elliptic acuminate at both ends smooth above faintly reticulate and pale beneath with 6–10 very slender nerves, umbels axillary solitary and fascicled 4-fld., bracts 4 glabrous, sepals 6, stamens 9 very villous below. Tetranthera rangoonensis, *var.* assamica, *Meissn. in DC. Prodr.* xv. 1. 188.

ASSAM plains, *Jenkins*, *Griffith* (*Kew Distrib.* 4309).

Branches rather slender, terete, pale, tips petioles and nerves beneath of very young leaves puberulous. *Leaves* 1–2 in. broad, very symmetrical in all the specimens, but varying greatly in size, narrowed into the very short (⅙–¼ in.) petiole, hardly shining above. *Umbels* few and scattered (probably the specimens are not in good flower), ¼ in. diam.; pedicel about as long; bracts very concave; flowers very small, shortly pedicelled, $\frac{1}{12}$ in. diam., villous at the base without and within, as are their pedicels. *Sepals* oblong. *Stamens* exserted, filaments villous, 3 2-glandular; anthers oblong. *Fruit* unknown.

17. **L. venulosa,** *Meissn. in DC. Prodr.* xv. 1. 187 (Tetranthera); quite glabrous, branches very slender, leaves 3–4 in. alternate penninerved very membranous oblong-lanceolate obtusely caudate-acuminate glaucous beneath, nerves 6–12 pair very slender, umbels 3–5-fld. male solitary, fem. often racemed, peduncle and pedicels very slender. Myristica glaucescens, *Wall. Cat.* 6790.

SOUTH DECCAN, *Heyne*, *Wight*. Tinnevelly Hills, alt. 3–4000 ft., *Beddome*.

An evergreen straggling bush; bark brownish. *Leaves* greenish when dry, quite smooth above, loosely reticulate beneath, base acute; petiole ¼–⅓ in., slender. *Umbels* ¼ in. diam.; pedicel ¼–⅓ in.; common peduncle in fem. ½ in. or less; flowers quite glabrous. *Sepals* 5 or 6, oblong, unequal, very transparent and gland-dotted. *Stamens* in the male 10, filaments glabrous, 6 2-glandular; anthers nearly square, gland-dotted; outer stamens of fem. with small subspathulate heads, inner short with large glands. *Ovary* ovoid, tapering into the slender style; stigma large, discoid. *Fruit* unknown. —Very closely allied to *Tetr. gemelliflora*, Miquel, of Java, which has a remarkable oblong fruit nearly 2 in. long seated on the unaltered perianth-tube; it is possibly a variety of it.

18. **L. firma**, *Blume Mus. Bot.* i. 381 (Tetranthera); branches glabrous, leaves 3–7 in. alternate penninerved red-brown when dry rigidly coriaceous oblong or obovate smooth above beneath minutely pubescent with 10–12 pairs of very strong arching nerves and slender parallel cross-nervules, male umbels 5-fld., pedicels sometimes on a very short peduncle, perianth densely villous, sepals narrow unequal. *Meissn. in DC. Prodr.* xv. 1. 190; *Miquel. Fl. Ind. Bat.* i. 950.

MALACCA, *Maingay* (*Kew Distrib.* 1271).—DISTRIB. Borneo, Celebes.

An evergreen tree or bush; branches woody, bark wrinkled when dry and quite glabrous. *Leaves* 3–7 in., very hard when dry, pale or dark red-brown, not reticulate above, often redder beneath; base acute or narrowed into the smooth glabrous petiole ½–¾ in. long. *Male umbels* very numerous, axillary and at the old leaf-scars, ⅓ in. diam., pedicels ⅙–¼ in.; bracts 4, pubescent. *Stamens* 9–16, 3–6 2-glandular. *Ovary* filiform or 0. *Fruit* not seen.

*** *Leaves alternate, pubescent or tomentose beneath.*

19. **L. grandis**, *Wall. Cat.* 2552 (Tetranthera); branches very stout, and leaves beneath densely brown-tomentose, leaves 8–16 in. alternate penninerved very thickly coriaceous and hard brown when dry oblong or obovate-oblong obtuse smooth above beneath with 12–16 pairs of very strong spreading nerves and strong parallel cross-nervules, petiole very stout, male umbels large 5–7-fld. in sessile fascicles or corymbose on a very stout peduncle, sepals long narrow subequal silky. Tetranthera grandis, *Meissn. in DC. Prodr.* xv. 1. 188; *Kurz For. Fl.* ii. 299. Polyadenia grandis, *Nees in Wall. Pl. As. Rar.* ii. 62, and *Syst. Laurin.* 574.

PEGU and TENASSERIM, *Kurz*. PENANG, *Porter*. MALACCA and SINGAPORE, *Maingay*.

A tree, 20–40 ft., with warted bark (*Kurz*). *Leaves* large, hard, 3–7 in. broad, nerves impressed above, tip often rounded; base obtuse or rounded; petiole very stout, 1–2 in. *Male umbels* numerous, rather silkily tomentose, ⅓–½ in. diam., in bud as large as a pea; pedicels ⅓ in.; bracts 5, coriaceous. *Sepals* linear-elongate. *Stamens* 12–14, anthers short, 3-4-glandular. *Fruit* unknown.—I do not know Meissner's *L. javanica* (*T. multiflora*, Zoll.), nor have I found amongst Wallich's plants specimens of *L. grandis* from Birma (as cited by Meissner). A Bornean plant of Beccari (Sarawak n. 2537) closely resembles this; it is in bud only.

20. **L. polyantha**, *Juss. in Ann. Mus.* vi. 211; branches and leaves beneath pubescent or tomentose, leaves 3–16 in. alternate penninerved chartaceous broadly or narrowly oblong ovate or obovate tip obtuse rounded or apiculate glabrous above strongly reticulate beneath base acute rounded or cordate, nerves 5–10 pair, umbels 5–6-fld. clustered and subcorymbose on a short peduncle, bracts 4–5, fruit globosely ellipsoid on a very small perianth-base. L. monopetala, *Pers. Synops.* ii. 4. Tetranthera monopetala, *Roxb. Cor. Pl.* ii. 26, t. 148, and *Fl. Ind.* iii. 821; *Nees in Wall. Pl. As. Rar.* ii.

66, and *Syst. Laurin.* 525; *Blume Mus. Bot.* i. 378; *Meissn. in DC. Prodr.* xv. 1. 189; *Miquel Fl. Ind. Bat.* i. 948; *Brand. For. Fl.* 380, t. 45; *Kurz For. Fl.* ii. 299; *Gamble Man. Ind. Timb.* 310. T. macrophylla, *Wall. Cat.* 2549. T. alnoides, *Miquel Pl. Jungh.* 180, and *Fl. Ind. Bat. l. c.* 948. T. fruticosa & verticillata, *Herb. Ham.* ? T. semecarpifolia, *Wall. Cat.* 6345 A. T. hexantha, *Sieb. Fl. Maurit.* 92. Tomex pubescens, *Herb. Willd.*

From PANJAB and the SALT RANGE along the foot of the HIMALAYA ascending to 3000 ft., eastwards to ASSAM and southwards to the SATPURA RANGE (*Brandis*). COROMANDEL (*Roxburgh*), TENASSERIM and PENANG. (*Not in Ceylon.*)—DISTRIB. Java, China (introd. in Mauritius).

An evergreen bush or small tree, 20–40 ft.; branches rather stout. *Leaves* extremely variable, the largest (Ava, *Wallich*) 16 by 9 in., usually rusty-brown when dry, rarely green, glossy above; nerves strong beneath; petiole $\frac{1}{2}$–1 in. *Umbels* (unopened $\frac{1}{8}$ in. diam.) densely tomentose, stoutly pedicelled. *Perianth* 5–6-partite. *Stamens* 9–13, filaments hairy. *Ovary* in ♂ 0, or with a slender style and small stigma. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in.—Brandis gives South India and Ceylon as habitats, but I have seen no Peninsular specimens, and the only authority for Ceylon is an unnamed scrap of Thwaites (C. P. 326), for which he gives no locality, and was probably not of his own collecting. Wallich's *semecarpifolia* (Cat. 6345 A) is, I think, this, but the specimen is a very bad one.

21. **L. amara,** *Blume Bijd.* 563; branches and leaves beneath rusty-tomentose rarely glabrate, leaves 4–6 in. alternate penninerved shortly petioled coriaceous brown elliptic or elliptic-lanceolate acute smooth above beneath reticulate with 8–15 pair of very strong nerves, umbels tomentose males clustered or very shortly racemose, females clustered subsessile, perianth densely villous, sepals small narrow very unequal, fruit ovoid or elliptic on the very small calyx-tube. Tetranthera amara, *Nees Syst. Laurin.* 551; *Kurz For. Fl.* ii. 299; *Blume Mus. Bot.* i. 379; *Miquel Fl. Ind. Bat.* i. 949; *Meissn. in DC. Prodr.* xv. 1. 199. T. fruticosa, *Nees l. c.* 543. T. capitulata, *Miquel Pl. Jungh.* i. 182, and *Fl. Ind. Bat. l. c.*

MALAY PENINSULA; from Pegu southwards to PENANG and MALACCA, *Griffith*, *Maingay* (*Kew Distrib.* 1276).—DISTRIB. Sumatra, Java, Borneo, Celebes.

An evergreen shrub or small tree, very variable in pubescence. *Leaves* rather hard when dry, usually shining above with fine impressed nerves, base acute or obtuse; petiole $\frac{1}{6}$–$\frac{1}{3}$ in. *Inflorescence* very variable; umbels $\frac{1}{4}$–$\frac{1}{3}$ in. diam., pubescent, or hirtellous; males sometimes merely clustered in the axils, at others corymbose or racemose on a short stout peduncle; pedicels very variable $\frac{1}{16}$–$\frac{1}{3}$ in., stout or slender, hirtellous or tomentose, as are the bracts. *Sepals* small, narrow, very unequal, almost obscured by the long villous hairs. *Stamens* 8–10, filaments villous, at length longer than the sepals, 3 inner 2-glandular; anthers short. *Ovary* in male 0, in female with a slender style and small discoid sub-2-lobed stigma. *Fruit* $\frac{1}{3}$ in. long, very shortly stoutly pedicelled; perianth-base disciform, truncate or obscurely 6-lobed or -toothed.—A very variable plant, of which there are many forms in the Archipelago.

Var. *fusco-tomentosa*, Meissn. l. c.; branches and leaves beneath villously rusty-tomentose. (Vars. puberula & pubescens, *Herb. Maingay* (*Kew Distrib.* 1251 and 1251/2), and var. velutina, *Herb. Griff.*, *Kew Distrib.* 4293.)

Var. *angusta*, Meissn. l. c.; branches and leaves beneath very finely pubescent or almost glabrous, umbels on slender fascicled pedicels $\frac{1}{8}$–$\frac{1}{2}$ in. long. Tetranthera angusta, *Wall. Cat.* 6344; *Nees in Wall. Pl. As. Rar.* iii. 30, and *Syst. Laurin.* 641.—Pegu to Tavoy, *Helfer* (*Kew Distrib.* 4294 and 4304), *Griffith* (*Kew Distrib.* 4295).

22. **L. rangoonensis,** *Meissn. in DC. Prodr.* xv. 1. 187 (*excl. var. β.*) (Tetranthera); branches leaves beneath and inflorescence finely rusty-tomentose, leaves 4–6 in. alternate penninerved thinly coriaceous green when dry oblong-lanceolate acuminate smooth above base rounded beneath finely reticulated with 10–14 pair of strong nerves, male umbels small axillary clustered 4–5-fid., perianth densely villous, sepals small very unequal.

PEGU; at Rangoon, *M'Clelland*. TENASSERIM, *Beddome*.

Very closely allied to *L. amara*, differing in the green very acuminate leaves; the perianth is quite the same, as are the 8 stamens, 3 of which are 2-glandular. The female, however, seems distinct in resembling the male, in being pedicelled, and having a large discoid stigma. *Fruit* unknown.—Meissner's *β. assamica* is a totally distinct plant (*L. assamica*, nob.), with slender nerves and leaves puberulous beneath.

23. **L. Kurzii,** *King in Herb. Calcutt.*; branches stout leaves beneath and inflorescence shortly brown-tomentose, leaves 6–10 in. alternate penninerved pale coriaceous oblong or oblanceolate-oblong acute or acuminate smooth and minutely reticulate above beneath with 12–18 pair of very strong rather spreading nerves and strong parallel cross-nervules, male umbels axillary in clusters 5-fid., perianth densely villous, sepals large unequal.

ANDAMAN ISLANDS, *Kurz*, &c.

An evergreen tree? *Leaves* glabrous above except the midrib, with the nerves impressed, base acute or rounded; petiole ½–1 in., stout. *Umbels* ⅓ in. diam.; bracts rather thin, sparsely tomentose; flowers densely villous without and within. *Perianth-lobes* much larger than in *L. amara*, and less unequal. *Stamens* 6–10, 3 2-glandular. *Fruit* unknown.

Sect. IV. **Cylicodaphne,** *Nees* (gen.). *Leaves* persistent, alternate (rarely opposite in *L. Wightiana*), penninerved. *Perianth-segments* usually 6, tube much enlarged disciform or cupular in fruit.—See also *L. Blumei*. (The fruit is known in most of the species; but not in most of the previous section, species of which may hence prove to be referable to this.)

* Umbels solitary or fascicled, rarely corymbose; if racemose, the peduncle or rachis is very short. (Some species of the racemose section have the raceme occasionally reduced to an umbel, as *L. Stocksii*, *Wightiana* and others.)

† Leaves more or less pubescent or tomentose beneath.

24. **L. khasyana,** *Meissn. in DC. Prodr.* xv. 1. 185 (Tetranthera); branchlets leaves beneath and inflorescence finely pubescent, leaves 6–12 in. alternate penninerved oblong or ob long-lanceolate pale above white or glaucous beneath with 10–15 pairs of very strong nerves and slender cross-nervules, umbels 6–8-fid. fascicled or subracemose on a very stout peduncle, fruit oblate much broader than the turbinate fleshy perianth-tube. Tetranthera glauca, var.? *Herb. Ind. Or. H.f. & T.*

KHASIA MTS.; on Ladder Hill, near Churra, alt. 2–4000 ft., *J. D. H. & T. T.*

A tree; branches long, rather stout. *Leaves* 2–4 in. broad, above greenish and quite smooth with impressed nerves, beneath white or rather rusty, at length glabrous, base acute; petiole about ½–1 in., at first tomentose. *Umbels* shortly stoutly pedicelled, flowering ⅓ in. diam.; bracts 4; peduncle ¼–½ in. *Sepals* silky without, glabrous within. *Stamens* (young) 7–9, glabrous. *Ovary* 0 in male, or very minute. *Fruit* 1 in. diam.; greatly depressed, broadest above the middle, ⅓ in. diam., ½ in. long *with the pedicel.*

Var. *Hookeri*; umbels larger, pedicel stouter, swollen perianth-tube as broad as the fruit which is larger. L. khasyana, *Herb. Calcutt.* Tetranthera Wightiana? *Herb. Ind. Or. H.f. & T.* Cylicodaphne? Hookeri, *Meissn. l. c.* 209, *excl. var. β.*—Sikkim, alt. 6000 ft., *King*, *Kurz*. Assam, Mishmi Hills, *Griffith* (*Kew Distrib.* 4286, 4287). Khasia Mts., at Churra and Amwee, alt. 3–4000 ft., *J. D. H. & T. T.*

25. **L. martabanica,** *Kurz For. Fl.* ii. 301; branchlets and leaves beneath densely tomentose, leaves 4–8 in. alternate penninerved coriaceous

long-petioled pale, elliptic-ovate or lanceolate acuminate, nerves 5–7 pair strong beneath with cross-nervules and conspicuous reticulations, male umbels 4–5 fld. solitary stoutly pedicelled, bracts 5–6, perianth-tube tomentose, fruit oblong seated on the thickened cupular or truncate very shortly pedicelled perianth-tube. T. calophylla, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102.

TENASSERIM and MARTABAN; in the drier hill forests, alt. 4–6000 ft., *Kurz.*

A tree, 25–35 ft.; branches rather stout, pale. *Leaves* in the male plant 3½–4½ in., almost ovate, in the fem. 8 in. and elliptic-lanceolate and caudate-acuminate, above yellow green when dry with impressed nerves, beneath grey or pale rusty-brown and shortly tomentose; petiole ½–1 in. *Male umbel* apparently always solitary, female shortly racemose (umbels sometimes in short corymbose peduncled racemes, *Kurz*); bracts broad, concave, coriaceous; flowers sessile. *Sepals* membranous, oblong, obtuse. *Stamens* 9, glabrous, 3 inner 2-glandular. *Fruit* ½ in. long, perianth-cup ½ in. broad, and with the pedicel about as long.—The foliage resembles *Lindera bifaria.*

26. **L. semecarpifolia,** *Wall. Cat.* 6345 B (Tetranthera ?); branchlets petioles leaves beneath and umbels tomentose or pubescent, leaves 6–7 in. alternate penninerved rigidly coriaceous obovate or obovate- or elliptic-oblong obtuse or subacute, beneath pale brown with 6–10 pairs of strong nerves and transverse nervules, umbels 6-fld. clustered subracemosely on a short stout peduncle, flowers large ¼ in. diam., fruit depressed globose seated on the large entire puberulous turbinately cup-shaped shortly thickly pedicelled perianth-tube. Tetranthera semecarpifolia, *Wall.*; *Nees Syst. Laurin.* 559; *Kurz For. Fl.* ii. 303; *Meissn. in DC. Prodr.* xv. 1. 198.

EAST BENGAL, *Griffith* (*Kew Distrib.* 4284). BURMA, *Wallich, Griffith.* MARTABAN, *Kurz.*—DISTRIB. Munnipore.

A tree, 25–30 ft. (*Kurz*); branchlets tawny-pubescent. *Leaves* 2½–5 in. broad, above green or brown smooth with impressed nerves, beneath grey brown or purplish. *Umbels* tomentose, about ½ in. broad in flower; bracts 4 (perhaps more); male flowers about 6, sessile, ¼ in. diam. when open. *Sepals* free to the base, linear-oblong, pubescent without and within, very unequal. *Stamens* about 8, very unequal, pubescent. *Ovary* (in the male) 0, or with a stout style and decurved discoid stigma. *Fem. fl.* smaller, with a thick funnel-shaped calyx-tube and very small lobes. *Fruit* ¾ in. diam., perianth-tube as broad, very thick, quite entire, with the very stout pedicel ¾ in. long.—Under *L. polyantha* it is stated that Wallich's 6345 A is probably that plant.

27. **L. elongata,** *Wall. Cat.* 2546 (Tetranthera); branchlets and leaves beneath rusty-tomentose, leaves alternate penninerved oblong or elliptic-lanceolate obtuse acute or acuminate, nerves 5–20 pair strong beneath with strong cross-nervules and conspicuous reticulations, umbels 4–5-fld. usually solitary peduncled, bracts coriaceous very unequal strongly ciliate, fruit oblong seated on the thickened expanded usually lobed pedicelled perianth-tube. Daphnidium ? elongatum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 620; *Meissn. in DC. Prodr.* xv. 1. 231. Tetranthera sikkimensis, *Meissn. l. c.* 181, *in part.*

TEMPERATE and SUBTROPICAL HIMALAYA; Garwhal, *King*; Nepal, *Wallich*; Sikkim alt. 6–8000 ft., *J. D. H.*, &c. Bhotan, *Griffith.* KHASIA MTS., alt. 5–6000 ft., *Griffith*, &c.

A bush or small tree, branches rather stout. *Leaves* exceedingly variable, rarely obovate or oblanceolate, longest 9 by 2 in. and caudate-acuminate, average 4–5 by 1–1½, broadest 8 by 3 in. with rounded or subacute tips, base acute, rarely obtuse or rounded; petiole ⅓–½ in. *Umbels* very rarely clustered; males ⅓–⅝ in. diam. in flower, fem. smaller; pedicel ¼–1 in., stout or slender; flowers silkily villous. *Sepals* 4–6, membranous, oblong, obtuse. *Stamens* 8–12, filaments villous with long hairs, sometimes ¼ in. long and very slender; anthers oblong. *Ovary* in male fl. minute; in fem. glabrous with a stout style and discoid stigma. *Fruit* ½ in. long; perianth-base about ⅓ in diam. with the thickened pedicel ⅓–½ in. long.—The leaves are so variable in shape and size, that I have difficulty in sorting the specimens into varieties thereby. A small-leaved state from Bhotan, Griffith, and Sikkim alt. 8000 ft., has rounded bases to the leaf. The only Garwhal specimen I have seen has sessile clustered umbels. In the Genera Plantarum this species is inadvertently (under *Lindera*, Sect. 3, v. iii. p. 163) referred to the section *Eulitsæa*; but the perianth is very well developed, and its tube much enlarged; it is therefore a good *Cylicodaphne*. It is very easily confounded with *Lindera assamica* and states of *L. bifaria*.

28. **L. nuculanea**, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102, and *For. Fl.* ii. 301; branchlets petioles and leaves beneath softly tomentose or sublanate, leaves 5–6 in. alternate penninerved thinly coriaceous obovate or obovate-oblong to oblong-lanceolate acute, base acute beneath glaucous reticulated and with 6–8 pair of rather slender nerves, umbels subsessile, fruit oblong mucronate pale yellow longer than the large subhemispheric truncate nearly smooth shortly peduncled cup. Cylicodaphne Hookeri, *var.* siamensis, *Meissn. in DC. Prodr.* xv. 1. 209.

TENASSERIM, *Kurz;* on Molyet, alt. 6000 ft., *Gallatly* (*in Herb. Calcutt.*).—DISTRIB. Siam.

A shrub; branchlets slender. *Leaves* 2–3½ in. diam., very softly tomentose beneath, above green and smooth with impressed nerves; petiole ¼–½ in. *Flowers* unknown. *Fruit* about ¾ in. long, cupular perianth-tube ⅓ in. diam., warted.—The fruit of this a good deal resembles in its colour and mucronate top that of the plant named *T. læta* in Herb. Calcutt. (not the true *læta*), which has lobed cups and longer petioles.

29. **L. coriacea**, *Heyne in Wall. Cat.* 2556 (Tetranthera); branchlets leaves beneath and umbels finely pubescent, leaves 4–6 in. alternate penninerved coriaceous elliptic-ovate or lanceolate acute or acuminate at both ends greenish above beneath at length glabrous brown and reticulated, nerves 6–10 pair, umbels 4-fld. small crowded subsessile, fruit small oblong seated on the enlarged cupular shortly pedicelled truncate perianth-tube. Tetranthera coriacea, *Heyne; Meissn. in DC. Prodr.* xv. 1. 186. T. micrantha, *Meissn. l. c.* 183.

DECCAN PENINSULA, *Heyne;* Courtallam, *Wight* (*Kew Distrib.* 2532).

Branches rather slender, bark pale. *Leaves* very variable in breadth, 1–2½ in., red-brown beneath, transverse nervules obscure; petiole very short, ⅛–¼ in. *Umbels* ¼ in. diam., when flowering, appressed to the branch in a small globose head; pedicel elongating a little in fruit; bracts 4, silky. *Male fl.* funnel-shaped, silky below. *Sepals* small, glabrous. *Stamens* 12, apparently glabrous; glands of those opposite the sepals very large. *Ovary*, if present, slender, with an erect small stigma. *Fruit* (unripe) ¼ in. long, obtuse, perianth-tube ⅓ in. broad, with the thickened pedicel sometimes ⅓ in. long.

30. **L. Hookeriana**, *Meissn. in DC. Prodr.* xv. 1. 188 (Tetranthera); branchlets very stout and leaves beneath densely softly brown-tomentose, leaves 4–6 in. alternate penninerved thickly coriaceous elliptic or obovate obtuse beneath not reticulate, nerves 6–8 pair, petiole very stout, male umbels 8–12-fld. subsilky or nearly glabrous, pedicel slender. L. nemoralis in part, *Trimen. Syst. Cat. Ceyl. Pl.* 76.

CEYLON, *Gardner.*

Branches with pale bark, and large scars of fallen leaves (mossed in the specimens). *Leaves* remarkably coriaceous, 2–2½ in. diam., smooth and pale brown above with faintly impressed nerves and a puberulous costa which is very stout beneath, not reticulated beneath under the pubescence; petiole ⅓ in. *Umbels* axillary and at the leaf-scars, in bud ¼ in. diam., obscurely pubescent; pedicel ⅛–½ in., slender; bracts concave; flowers (very young) funnel-shaped, silky below without and within. *Sepals* oblong, glabrous, small. *Stamens* 6, apparently glabrous. *Fruit* and fem. fl. unknown.—A well-marked plant (totally distinct from *T. nemoralis*); of which only two specimens are known, both in young flower; so the above character will probably require modification. Its nearest ally is *L. longifolia*.

31. **L. longifolia,** *Nees Syst. Laurin.* 528 (Tetranthera); branchlets leaves beneath and umbels rusty-tomentose, leaves 6–12 in. alternate penninerved coriaceous elliptic elliptic-lanceolate or obovate obtuse acute or acuminate, beneath strongly reticulate, nerves 6–10 pair, umbels densely clustered shortly peduncled about 10-fld., fruit small globose seated on the expanded concave thickened perianth-tube. L. cauliflora, *Moon Cat.* Tetranthera longifolia, *Nees ex Meissn. in DC. Prodr.* xv. 1. 188 (*excl. var.* β.); *Thwaites Enum.* 255 (*excl. var.* γ.).

CEYLON; common in the Central Province, alt. 4–7000 ft.

A small sparingly branched tree (*Thwaites*). *Leaves* very variable in size, the largest 7 in. broad, brownish green when dry and often harshly pubescent above, reticulations beneath broad, base acute or rounded; petiole ⅓–½ in., stout. *Umbels* in flower ¼ in. diam.; bracts 4, subequal; flowers rusty-tomentose, villous below. *Sepals* unequal, sometimes antheriferous. *Stamens* 12, filaments slender hairy, inner anthers short sometimes 2-celled. *Fruit* about ⅓ in. diam., much broader than the entire perianth-tube.—The name *longifolia* is not appropriate. Meissner's var. β. *nitida*, from Moulmein, is unknown to me. Thwaites' var. γ. is *L. glaberrima* (*T. nervosa* β. *chartacea*, Meissner.)

32. **L. nemoralis,** *Thwaites Enum.* 255; branchlets petioles and leaves beneath densely rusty-villous or tomentose, leaves 1–2 ft. alternate penninerved linear- or elliptic-lanceolate acuminate, nerves 12–15 pair strong and spreading beneath, umbels small clustered glabrous or very sparsely hairy.

CEYLON; about 21 miles from Galle, alt. 1000 ft., under large forest trees, *Gardner, Thwaites.*

A bush, 10–12 ft.; stem erect or sparingly branched; branches robust. *Leaves* 3–4 in. broad, not thickly coriaceous, green above when dry with tomentose midrib, almost woolly, loosely reticulate and pale beneath between redder villous nerves; petiole 1–2 in., very stout. *Flowers* and *fruit* not seen.—Most of the above description is from Thwaites, who says in a note that he has never found flowers or fruits, but that the former were found by Gardner. It is a noble species, and quite unlike any other.

†† Leaves glabrous beneath or nearly so. (*See also* L. Stocksii.)

a. *Species of the Himalaya, Assam, Khasia and Silhet.*

33. **L. salicifolia,** *Roxb. ex Wall. Cat.* 2536 (Tetranthera); glabrous or branches and leaves beneath hoary, leaves 3–12 in. alternate penninerved chartaceous broadly or narrowly elliptic or oblong acute or acuminate usually glaucous beneath, nerves 8–15 pair, umbels clustered glabrous rarely hoary 4–6-fld., pedicels short, stamens villous, fruit ellipsoid, perianth-tube hardly enlarged or small and cup-shaped. T. salicifolia, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 66 and 30, and *Syst. Laurin.* 534. T. glauca, *Wall. Cat.* 2533; *Meissn. in DC. Prodr.* xv. 1. 185 (*excl. var.* δ.); *Nees ll. c.* 66 and 531; *Kurz For. Fl.* ii. 300. T. laurifolia, *Roxb. in Wall. Cat.* 2535 (*not of Fl. Ind.*). T. attenuata, *Wall. Cat.* 2534; *Nees in Wall. l. c.* ii. 6 and iii. 30, and *Syst. Laurin.* 533. T. lanceæfolia, *Roxb. Fl. Ind.* iii. 822; *Kurz*

For. Fl. ii. 300 (*lancifolia*). T. salicifolia & saligna, *Herb. Ind. Or. H.f. & T.*

NORTHERN and EASTERN INDIA; from Oude and Nepal to Sikkim (ascending to 6000 ft.). Assam, Bengal, Chittagong and Pegu.

An evergreen bush or small tree; branches never very stout, bark dark or black. *Leaves* very variable, pale brown or darker above when dry, smooth and usually obscurely reticulated above, nerves beneath strong with faint nervules; petiole ⅓–1 in. *Umbels* ¼–⅓ in. diam., nerves corymbose, glabrous or hoary. *Stamens* 6–9, usually very short, with villous filaments. *Fruit* ⅓ in. long, purple-black; perianth-tube variable in size, but always small and narrower than the base of the ripe fruit, and rarely cupular as in *L. oblonga*, from which it is hardly distinguishable.—I have vainly endeavoured to arrange the many forms of this protean plant under the varieties proposed by Meissner, the characters of which are chiefly taken from the reticulation and hoariness of the foliage. Of Nees' var. γ. *lævigata*, which is Meissner's var. δ., from Courtallam, Wight, I know nothing. The following marked forms are united by intermediates.

Var. 1. *ellipsoidea*, Meissn.; branches hoary, leaves large 4–12 in. broadly elliptic or oblong passing into lanceolate glaucous beneath, petiole often 1 in., umbels subsessile in dense subglobose heads.—Sikkim, Assam, Khasia, Silhet.—The type of Wallich's *glauca*.

Var. 2. *elongata*, Meissn.; branches hoary or glabrous, leaves narrower, petiole often long, umbels on stout pedicels more loosely clustered.—Assam, Khasia and Silhet.—I suppose this to be Meissner's var. as named; his locality of Penins, Ind. *Hb. Wight*, founded on an Assam specimen in Herb. Wight.

Var. 3. *attenuata*, Meissn.; branches quite glabrous, leaves subdistichous about 6 by 1½ in. linear-oblong acute shining above brown beneath, petiole short, umbels in globose clusters.—Assam, Silhet, &c.—This is Wallich's *T. attenuata* (Cat. 2534 A.).

Var. 4. *laurifolia*; branches hoary, leaves subdistichous 3–5 by ⅔–1 in. linear-oblong obtuse or acute brown and glabrous or grey and hoary beneath, petiole short, umbels loosely clustered, pedicels short slender.—Common in Assam, Khasia, Silhet and Bengal, from the Sunderbunds to Chittagong.—This is *T. laurifolia*, Herb. Ham., and Wallich's *T. salicifolia*, Herb. Roxb. (Cat. 2536), and *T. angustifolia* of Gamble (Man. Ind. Timb. 311). It is very similar to *L. angustifolia*, Wall., but has fewer nerves and broader leaves.

Var. 5. *polyneura*; leaves 5–10 in. elliptic-lanceolate acuminate polished above, nerves 12–16 pair.—Sikkim and Khasia, alt. 3–4000 ft.

Var. ? 6. *reticulata*; leaves 5–9 in. elliptic-lanceolate caudate-acuminate, upper surface reticulated with pale nervules under brown, stigma in male fl. very large discoid.—A small tree from the Myrung woods, Khasia. *T. salicifolia* in part, *Herb. Ind. Or. H.f. & T.*—This is probably a different species, but in the absence of fruit I hesitate to name it as such.

34. **L. oblonga,** *Wall. Cat.* 2542 (Tetranthera); glabrous or nearly so, leaves 4–7 in. alternate penninerved elliptic- or oblong-lanceolate subacute pale brown and subglaucous beneath with 8–10 pair of slender nerves and no cross-nervules, umbels in shortly peduncled corymbs or shortly racemose 3–6-fld., bracts and pedicels glabrous or hoary, fruit oblong base immersed in the small cupular perianth-tube. Cylicodaphne oblonga, *Meissn. in DC. Prodr.* xv. 1. 205, *excl. var.* Tetranthera oblonga, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 551. ? T. Doshia, *Don Prodr.* 65. Tomex Doshia, *Ham. mss.*

NEPAL, *Wallich.* Assam and Khasia Mts., *Jenkins*, *Griffith* (*Kew Distrib.* 4300).

A shrub or small tree, so similar to *L. salicifolia*, that I suspect it to be only a more glabrous state of that plant with more corymbose inflorescence, rather larger umbels, and a longer narrower fruit, ⅔ of an in. long.—Meissner's var. *Stocksii* is *L. Stocksii*, nob., and his var. *Griffithii* is *L. myristicæfolia*, Wall. This and *L.*

salicifolia are referable either to sect. *Conodaphne* or *Cylicodaphne*, according to the development of the perianth-tube.

Var. ? *albescens*; leaves shorter and broader nearly white beneath.—Outer ranges of the Sikkim Himalaya, alt. 4–6000 ft., *J. D. H.*, *Clarke*.

35. **L. angustifolia,** *Wall. Cat.* 2537 (Tetranthera); nearly or quite glabrous, leaves 3–8 in. shortly petioled alternate penninerved narrowly linear-lanceolate acute or acuminate, nerves 15–30 pair, umbels simple chiefly axillary solitary or clustered glabrous, pedicels slender. Tetranthera angustifolia, *Wall.*; *Meissn. in DC. Prodr.* xv. 1. 183, *in part.* T. saligna, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 539.

SILHET, *De Silva.* Chittagong, *Clarke, Lister.*—DISTRIB. Munnipore.

Branches slender, young hoary. *Leaves* ⅓–⅔ in. diam., dark brown when dry above, grey brown beneath, smooth, nerves slender; petiole ¼–⅓ in. *Umbels* small, male ⅓ in. diam., about 6 fld.; flowers nearly glabrous. *Sepals* oblong. *Stamens* 6–9, filaments sparsely hairy, hardly longer than the sepals. *Fem. fl.* and *fruit* not seen.—Wallich's specimens have very slender branches and leaves only 3–4 in. Meissner, misled by wrongly named specimens, has described the young fruit of another plant for that of this. The usually much longer narrow leaves with many nerves and slender pedicels of the umbels distinguish this from *L. salicifolia.* It is perhaps nearer to *L. oblonga.*

36. **L. Meissneri,** *Hook. f.*; quite glabrous except the bracts and flowers, leaves 3–5 in. alternate penninerved coriaceous narrowly elliptic-lanceolate obtusely subcaudate-acuminate pale finely reticulated on both surfaces subglaucous beneath, nerves 10–15 pair slender and raised above, umbels 4-fld. solitary shortly pedicelled, bracts 4 silky long ciliate coriaceous very unequal outer smaller, perianth 4-lobed, stamens 9. Litsæa ? khasiana, *Meissn. in DC. Prodr.* xv. 1. 227. Dodecadenia ? *Herb. Ind. Or. H. f. & T.*

KHASIA MTS.; near Churra and the Boga panee, alt. 4–5000 ft., *J. D. H. & T. T.*

Branches rather slender. *Leaves* ⅔–1½ in. broad, very pale yellowish brown, smooth and almost shining above when dry, base acute, nervules raised beneath, but hardly transverse; petiole ¼–⅓ in., slender. *Umbels* (male) ½ in. diam., on stiff stout pedicels or subsessile; bracts very concave, whitish when dry, fringed with long brown hairs; flowers sessile, silky. *Sepals* membranous, broadly oblong. *Stamens* short, filaments hairy; anthers small, very short. *Ovary* imperfect, style hairy, stigma 2-lobed.—This is quite unlike any other species of either *Actinodaphne* or *Litsæa*, but is in some respects nearest *L. elongata* in the solitary umbels with unequal long ciliate bracts. I found specimens of a similar shrub at the coal-pits near Churra, in which the nerves are more numerous and spreading, and the very young umbels seem to be crowded on a very short peduncle.

37. **L. læta,** *Wall. Cat.* 2541 (Tetranthera); glabrous or nearly so, leaves 5–14 in. alternate penninerved coriaceous pale when dry elliptic- or linear-oblong or -lanceolate acute glaucous beneath finely reticulate on both surfaces, nerves 5–8 pair, umbels 3–8-fld. large in sessile clusters usually long-pedicelled glabrous or hoary, bracts 4–5, stamens 9–12, fruit large globose seated on a large pedicelled turbinate perianth-tube. Tetranthera læta, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 548 and 677; *Meissn. in DC. Prodr.* xv. 1. 186 (*excl. var.* γ. ? *glauca*).

TROPICAL EASTERN HIMALAYA; Sikkim and Bhotan. ASSAM, KHASIA MTS. and SILHET, alt. 2–4000 ft., common.

A small tree; branches rather slender; shoots and young leaves beneath very finely pubescent. *Leaves* very variable in breadth, pale green or yellow above when dry, and white or very pale reddish beneath, base acute; petiole ⅓–½ in., stout in the larger leaves. *Umbels* 3–10 in a cluster, in bud ¼–⅓ in. diam., usually finely hoary, sometimes tomentose or glabrous; pedicel ½–1 in., stout; flowers subsessile, about ⅓ in. diam. *Sepals* oblong, subequal, nearly glabrous. *Stamens* very unequal and irregular as to glands, at length far exserted, filaments hairy. *Ovary* with a large discoid stigma. *Fruit* 1 in. diam.; perianth-tube fleshy, as is its large turbinate pedicel. —Meissner's β. *major* is only a large-leaved specimen; his γ. *glauca*, from Ceylon, is *L. glaberrima*, Thwaites. A plant called *T. læta* in Herb. Calcutt. from the Ryang River in Sikkim, alt. 2000 ft., differs remarkably in the fruit, which is ⅔ in. long, oblong, mucronate and nearly white; its fruiting perianth-tube is subcampanulate, ½ in. diam., with a sinuately lobed mouth.

38. **L. Thomsonii,** *Meissn. in DC. Prodr.* xv. 1. 183 (Tetranthera); quite glabrous, leaves 5–7 in. alternate penninerved firmly coriaceous linear-oblong or elliptic-lanceolate acuminate pale brown above paler beneath with 6–10 slender nerves very obscurely reticulated, umbels in short subracemose corymbs, peduncles and pedicels short stout, young fruit globose. Tetranthera læta, *Wall.* ? *Herb. Ind. Or. H. f. & T.*

SILHET; near the station, *J. D. H. & T. T.*

A large tree; branches stout. *Leaves* 2–3 in. broad, base acute, hardly shining above, not glaucous beneath; petiole ½–1 in. long, stout. *Corymbs* axillary and in the leafless axils, rounded, about 1 in. diam.; pedicels spreading; pedicels of very young fruit clavate with the truncate perianth-tube of immature fruit ¼ in. diam., and globose; young fruit about ⅓ in.—Apparently a very distinct plant, but having neither flower nor ripe fruit, it is not in a state for satisfactory description.

39. **L. chartacea,** *Wall. Cat.* 2531 (Tetranthera); quite glabrous except the inflorescence, branches slender, leaves 3–5 by 1¼–1½ in. alternate penninerved thinly coriaceous elliptic-lanceolate acuminate pale subglaucous and reticulated beneath, nerves 6–8 pair slender, petiole very slender, female umbels small fascicled peduncled 6–8-fld., flowers stoutly pedicelled, fruit ellipsoid on a broad cupular perianth-tube. Tetranthera chartacea, *Wall.*; *Meissn. in DC. Prodr.* xv. 1. 186 (*the Nepal plant only*); *Nees in Wall. Pl. As. Rar.* ii. 67 and iii. 30, and *Syst. Laurin.* 546.

NEPAL, *Wallich.* SIKKIM; at Rishap, alt. 5500 ft., *King.*

A moderate-sized tree (*King*). *Leaves* finely reticulate between the nerves beneath, base acute; petiole ½ in., more slender than in its allies. *Umbels* ⅙ in. diam. when expanded, pedicels about as long, both finely fulvous-pubescent; bracts 4, rounded; flowers 1/12 in. diam., coriaceous, funnel-shaped. *Sepals* small, very variable in shape and length. *Ovary* ovoid; style stout, stigma simple. *Fruit* ⅝ in. long, obtuse, black when dry; cupular perianth-tube ⅓ in. diam., rather suddenly narrowed into the thickened clavate peduncle, together ½–⅝ in. long.—Wallich's specimens from Nepal are males, King's from Sikkim are in fruit, but they appear conspecific; together they form very insufficient material. The small umbels and pale leaves with very slender petioles are the most prominent characters. The Sikkim plant referred to this by Meissner is *Dodecadenia paniculata*, with a very different flower and fruit. Of his Java plant (Zollinger 2853 b) I know nothing. His var. β. ? *nervosa* (Wall. Birm. Herb. 1463, from Amherst) is *L. Wallichii*, nob.

b. *Species of Pegu, the Eastern Peninsula, Penang and the Andamans.*

40. **L. leiantha,** *Kurz For. Fl.* ii. 300 (Tetranthera); quite glabrous, branches and leaves blackish when dry, leaves 4–6 in. alternate penninerved coriaceous elliptic obovate or obovate-oblong obtuse or subacute, smooth above faintly reticulate beneath with 6–9 pairs of moderately stout nerves, umbels fascicled long-pedicelled glabrous 5-fld., bracts glabrous, perianth nearly glabrous.

ANDAMAN ISLANDS; Mount Harriet, in forests, *Kurz.*

Branches stout, smooth, young buds quite glabrous. *Leaves* 3–3½ in. broad; base acute or obtuse, rather unequal; petiole 1–2 in., stout, black. *Umbels* in bud as large as a small pea, pedicels ⅛ in., not very stout; bracts hardly coriaceous, 2 outer opposite, very concave, inner membranous; flowers sessile, sparsely hairy below. *Sepals* scarious, unequal, linear-oblong. *Filaments* hairy. *Ovary* of male minute, with a large stigma. *Fruit* unknown.—I have seen but one specimen, in bud, communicated by Dr. King; it much resembles (and is probably) *Tetr. elliptica*, Nees, of Java, and *T. nigricans* of Borneo, which latter has smaller cymose or subracemose umbels.

41. **L. petiolata,** *Hook. f.*; branches and leaves glabrous, leaves 4–5 in. alternate long-petioled penninerved coriaceous pale brown when dry elliptic or oblong obtuse or subacute smooth above beneath minutely reticulate with 5–6 pairs of slender nerves, umbels below the leaves clustered very shortly pedicelled 5-fld., bracts 4 outer glabrous, sepals 6 with long lax hairs, stamens 9–10, filaments long slender villous.

MALACCA, *Maingay* (*Kew Distrib.* 1265).

Branches grey brown when dry, tips and young leaves glabrous. *Leaves* much like *L. leiantha*, but the petioles rather shorter and more slender, shining above, hardly glaucous beneath. *Umbels* ⅓ in. diam.; outer bracts hardly coriaceous, inner membranous slightly pubescent, innermost small; flowers on villous pedicels laxly clothed with long rufous flexuous hairs. *Sepals* linear-oblong, membranous. *Filaments* far exserted, 2 or more 2-glandular. *Ovary* (in male) rudimentary, filiform, with a very large discoid stigma. *Fruit* and *fem. fl.* unknown.—The long petioles are characteristic.

42. **L. castanea,** *Hook. f.*; branchlets hoary, leaves 3–6 in. alternate penninerved hard coriaceous and dark brown when dry glabrous oblong or obovate-oblong obtuse very finely reticulate on both surfaces, base acute or obtuse, nerves 12–16 pair impressed above very strong beneath, umbels solitary clustered or corymbose on a very short peduncle 5–4-fld., pedicels stout, bracts 4 very coriaceous white-tomentose, stamens 10–15 villous.

MALACCA, *Maingay* (*Kew Distrib.* 1269).

Branches woody, dark grey brown, not stout. *Leaves* 1½–2½ in. diam., smooth but not shining above, paler brown beneath; petiole ¾–1 in., rather slender. *Umbels* ½ in. diam., pedicels as long; bracts very concave, persistent with involute margins when dry, glabrous within; flowers minute, sessile, $\frac{1}{10}$ in. diam. *Sepals* 6, linear-oblong, or linear, obtuse, very unequal, villous. *Stamens* variable in number, filaments very slender, villous, 3–4 with small pedicelled glands; anthers short, broad. *Ovary* in fl. male 0. *Fruit* unknown.—This Maingay has referred to *Cylicodaphne obtusifolia*, Nees, of Java, which differs in the leaves being nerveless.

43. **L. albicans,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 102, and *For. Fl.* ii. 303 (Tetranthera); glabrous except the shoots and inflorescence, leaves 6–10 in. alternate penninerved thinly coriaceous lanceolate or oblong-lanceolate shortly acuminate base narrowed beneath glaucous and reticulate, nerves 6–10 pairs slender, umbels clustered on a short peduncle, fruit in a large fleshy waved perianth-tube narrowed into a thick pedicel.

PEGU; in tropical forests on the Eastern slopes, *Kurz.*

A tree, 20–25 ft.; branches rather slender. *Leaves* 2–2½ in. broad, obscurely reticulate above, base very acute; petiole ⅓–⅔ in. long. *Umbels* small.—I have seen only leaves and very young umbels. The description is almost wholly from Kurz.

44. **L. penangiana,** *Hook. f.*; glabrous or nearly so, leaves 5–8 in. alternate penninerved coriaceous pale when dry elliptic-oblong obtuse or acute finely reticulate on both surfaces, nerves 5–8 pair, umbels in sessile

clusters hoary-pubescent 6-fid., bracts 4, fruit ½ in. ellipsoid seated on the subsessile hemispheric perianth-tube.

PENANG, *Phillips*; on Government Hill, *Maingay* (*Kew Distrib.* 1258/2).

Hardly distinguishable without the fruit from *T. læta*. It is very closely allied to *Tetranthera sessiliflora*, Meissn., *T. accedens*, Blume, *T. lucida*, Blume, and *T. diversifolia*, Blume, but the fruit is larger than in any of these. It may be the same as *T. tuberculata*, but that is described as having subglobose fruit.—In shape the cup of the fruit resembles *L. Blumii*, which differs in the opposite leaves.

45. **L. longipes,** *Meissn. in DC. Prodr.* xv. 1. 205 (Cylicodaphne); quite glabrous, leaves 6–8 in. alternate penninerved very coriaceous oblong obtuse pale above glaucous beneath with 6–10 pairs of slender nerves and very faint reticulations, umbels quite glabrous, fruiting perianth-tube 1 in. diam. hemispheric very fleshy, pedicel 1¼ in. long. Tetranthera myristicæfolia, *Wall.*; *var.* longipes, *Kurz For. Fl.* ii. 302.

TENASSERIM, *Helfer* (*Kew Distrib.* 4281); Mergui, *Griffith*.

Branches rather slender, black when dry. *Leaves* 3–3½ in. diam., when dry greenish above smooth and hardly shining, base acute; petiole ⅔–1 in. *Umbels* very young, quite glabrous. *Fruiting umbels* axillary, peduncle much shorter than the pedicels, which are gradually thickened upwards; large perianth-tube very rugose when dry.

46. **L. myristicæfolia,** *Wall. Cat.* 2548 (Tetranthera); quite glabrous, leaves 3–9 in. alternate penninerved oblong or elliptic-oblong or lanceolate rarely obovate obtuse or acute beneath brown or glaucous with 6–10 pairs of very faint nerves, umbels numerous 4–6-fid. quite glabrous in peduncled clusters or corymbs, fruit small globose immersed in the cupular fleshy shortly pedicelled perianth-tube. Cylicodaphne myristicæfolia, *Meissn. in DC. Prodr.* xv. 1. 208; *Kurz For. Fl.* ii. 102 (*in part*). C. oblonga, *var.* γ. ? Griffithii, *Meissn. l. c.* 205. Lepidadenia Griffithii, *Wight Ic.* t. 1846. Diospyros ? acuminata, *Wall. Cat.* 4129.

PEGU, *Kurz*.. TENASSER[illegible] at Tavoy, *Wallich*. PENANG, *Porter*. MALACCA, *Griffith*, *Cumming*, *Maingay*.

A small tree; branches woody. *Leaves* very variable in size and form, but uniform in texture, drying dark or light-coloured, above quite smooth, not shining; petiole ⅓–⅔ in., rather stout. *Umbels*, flowering ⅓ in. diam.; pedicels rather slender, ⅔–1 in.; bracts 4–6, coriaceous, 6–fid. (4-fid., *Kurz*). *Sepals* 6, glabrous, obscurely lobed or toothed. *Stamens* 10–12, quite glabrous. *Fruit* ⅓ in. diam.; perianth-tube clavate, ½ in. diam., very fleshy, rugose when dry, narrowing into the very fleshy clavate pedicel, together ⅔–½ in. long.—This and the preceding are almost the only species of this section with quite glabrous umbels. Kurz, who unites them as varieties describes the fruit as obovate-globular, of the size of a small cherry, and the thick fleshy entire smooth cup as ¾ in. diam.. Meissner's var. β. *tavoyana* is the form with short leaves; and var. *acutata* the narrower more acute leaved one. The Canara plant referred to the latter is *L. Stocksii*, nob.

47. **T. Helferi,** *Hook. f.*; glabrous, leaves 3 in. alternate penninerved very coriaceous ovate or elliptic-ovate acuminate smooth and brown when dry above beneath pale brown with 4–6 very slender nerves and very faint reticulations, umbels solitary pedicelled 4-fid., bracts 4 glabrous outer largest, sepals 6 glabrous, stamens 12.

TENASSERIM (or Andaman Islands), *Helfer* (*Kew Distrib.* 4307).

Branches woody; bark rough, whitish. *Leaves* very finely acuminate, margins slightly recurved when dry, base acute; petiole ⅓–½ in., very slender. *Umbels* (male) about ⅓ in. diam.; bracts black when dry; pedicel ⅓ in., slender, decurved. *Sepals* subequal. *Filaments* quite glabrous except at the base; anthers short. *Ovary* not seen. *Fruit* unknown.—A very distinct species, of which the materials are scanty.

c. *Species of Ceylon.*

48. **L. glaberrima,** *Thwaites Enum.* 255 (Tetranthera); glabrous or nearly so, branches slender, leaves 2–7 in. alternate penninerved thinly coriaceous greenish when dry oblong-lanceolate or oblanceolate acuminate smooth above very finely reticulate (rarely puberulous) beneath with 6–8 pair of very strong arched nerves that form large loops within the margin lowest pair shortest, umbels in very short racemes or fascicles 4-fld., bracts 4–5 glabrous, fruit oblong seated on the small dilated cup-shaped perianth-tube. Tetranthera nervosa, *Meissn. in DC. Prodr.* xv. 1. 187. T. longifolia *var.* γ., *Thwaites l. c.* T. læta, *var.* γ. ? glauca, *Meissn. l. c.* 187. Cylicodaphne Thwaitesii, γ. angustata, *Meissn. l. c.* 208.

Ceylon; in the Central Province, alt. 4000 ft., *Walker*, &c.

A small tree; branches glabrous or puberulous. *Leaves* variable in size, opaque above, glaucous or not beneath, base acute or obtuse; petiole ¼–½ in., glabrous or puberulous. *Umbels* few, ⅓ in. diam.; pedicel short, slender; common peduncle, if present, not ⅓ in. long; outer bracts very concave, membranous, innermost narrow; flowers shortly pedicelled; pedicels silkily villous, as are the perianth-tube and bases of the sepals. *Sepals* unequal, membranous, linear-oblong, sparsely hairy, villous at the base within. *Stamens* 8; filaments very slender, hairy; anthers broad, 2 or 3 2-glandular. *Ovary* in male a slender minute column with no stigma. *Fruit* ⅓ in. diam.; base of perianth as broad, on a thickened pedicel.—The remarkable nervation distinguishes this. Meissner's *T. nervosa* vars. α. and β. are individuals only.

49. **L. ovalifolia,** *Thwaites Enum.* 256 (Tetranthera); quite glabrous, branches robust, leaves 2–4 in. alternate penninerved rather long-petioled thickly coriaceous brown when dry broadly oblong-orbicular or elliptic rarely ovate-lanceolate rounded at both ends or base acute, very finely reticulate beneath with 6–10 very faint free nerves, umbels clustered very shortly stoutly pedicelled 5–6-fld., bracts 4 pubescent, sepals 6 (4–8), fruit subglobose seated on the thickened cupular perianth-tube. Lepidadenia ovalifolia, *Wight Ic.* t. 1839. Cylicodaphne Thwaitesii, *Meissn. in DC. Prodr.* xv. 1. 208, *var.* α. *only.*

Ceylon; Central Province, alt. 2–7000 ft., *Walker*, &c.

A tree, 30–40 ft.; branches rather rough. *Leaves* very variable, rigid, flat, above smooth or shining with very obscure nerves, beneath pale or dark brown opaque or rather shining with a stout midrib, base rarely cordate; petiole stout, ¼–⅜ in. *Umbels* sometimes clustered on a short stout peduncle, ⅓ in. diam.; bracts very coriaceous; flowers on short villous pedicels. *Sepals* 6 in the flowers I have examined (4–8 according to Thwaites), oblong, glabrous. *Stamens* 9–12 (8–16 or more, Thwaites), inner 2-glandular; filaments short, sparsely hairy; anthers broad. *Fruit* ⅓–½ in. diam. in a large fleshy shortly stoutly pedicelled almost hemispheric cup.—Some specimens from Walker, doubtfully referred to *Cylicodaphne Gardneri* by Meissner, have elliptic leaves with the surface convex above between the deeply sunk nerves, and correspondingly concave beneath; others, as Thwaites' C.P. No. 10 and 351, are exactly intermediate between this and *L. iteodaphne.* I refer here Thwaites' C.P. 2487, which has longer petioles than *L. iteodaphne.*

50. **L. iteodaphne,** *Thwaites Enum.* 255 (Tetranthera); glabrous except the pubescent umbels, leaves alternate penninerved coriaceous shortly petioled oblong or linear-oblong and obtuse or linear-lanceolate and acuminate smooth above beneath finely reticulate glaucous or not, nerves 6–10 pair very slender, umbels small few or solitary clustered 4–5-fld., pedicels

very short and usually stout, sepals usually 4, fruit oblong on the small cupular swollen perianth-tube. ? Tetranthera iteodaphne, *Nees Syst. Laurin.* 542. Cylicodaphne Thwaitesii, *Meissn. in DC. Prodr.* xv. 1. 208 (*excl. var. a, ovalifolia*).

CEYLON; in the Central Province, ascending to 6000 ft., *Walker*, &c.

A very puzzling plant, of which the specimens are not sufficient for a full description. I am uncertain as to its being the *T. iteodaphne* of Nees, whose description is insufficient, and who further describes the sepals as 6, and the bracts as strigose. I find only 4 sepals, and rarely more than 8 stamens. Thwaites sends three forms.

1. Leaves 3–4 by 1–1½ in. oblong or narrowly oblong obtuse or acute dark brown above when dry, base acute obtuse or rounded.—Adams Peak (C.P. 10, 857, 729, 2605). Cylicodaphne Walkeri, *Meissn. l. c.* This approaches *L. ovalifolia*, Thw.

2. Leaves 3—5 in. oblong-lanceolate acute or acuminate pale above more so and almost glaucous beneath, petiole very short.

3. Leaves 4–6 by ¾–1 in. linear lanceolate acuminate pale on both surfaces, petiole short, male umbels solitary on slender pedicels ¼ in. long, fem. fruiting perianth smaller. Var. β., Thwaites (C.P. 360). C. iteodaphne γ. angustata, *Meissner l. c. in part.*

Another form, sent by Walker only, has leaves 5–6 by 1 in., oblong-lanceolate, grey-brown beneath with often 12–15 pairs of more conspicuous nerves.—I assume it to be *T. Walkeri*, Meissn. Thwaites' numbers are very confusing, because of the badness of most of the specimens, and because those in different herbaria are attached to dissimilar specimens. I have hence not quoted some of them, or Meissner's references to them. C.P. 729 in Herb. Hook. is quite undeterminable: probably referable to var. 2.

** Umbels racemed.

† *Leaves quite glabrous beneath* (*except* L. Stocksii). (*See also* L. Gardneri.)

51. **L. glabrata,** *Wall. Cat.* 2543 (Tetranthera); quite glabrous except the silkily hoary inflorescence, leaves 5–7 in. alternate penninerved, coriaceous linear- or elliptic-oblong or -lanceolate acute or acuminate faintly reticulate beneath with 10–12 pairs of nerves, male in racemes 3–5 in. long 6-fid., pedicels long. Tetranthera ? glabrata, *Wall.*; *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 560; *Meissn. in DC. Prodr.* xv. 1. 197. Laurus salicifolia ?, *Wight mss.*

DECCAN PENINSULA; Dindygul Hills, alt. 3000 ft., *Wight.*

Very near *L. Panamonja*, and perhaps only a variety of that plant, or rather of its Tenasserim larger umbelled form; but the flowers, which are in bud only, are densely silky (not tomentose), the racemes less tomentose, the stamens more hairy; and in the absence of developed flowers and fruit I hesitate to unite them. Their foliage is very similar, but the umbels of the Deccan plant are rather larger.

52. **L. nitida,** *Roxb. ex Wall. Cat.* 2540 (Tetranthera); quite glabrous, leaves 4–10 in. alternate penninerved thinly coriaceous oblanceolate or obovate-oblong tip rounded retuse or subacute, faintly loosely reticulate beneath with 10–14 pair of very slender nerves, male umbels long-pedicelled 4–5-fid. in slender glabrous racemes 2–4 in. long, female racemes much shorter, fruit ellipsoid sunk in the enlarged subspherical shortly pedicelled perianth-tube. Tetranthera nitida, *Roxb.*; *Nees in Wall. Pl. As. Rar.* ii. 67 and iii. 31, and *Syst. Laurin.* 556; *Kurz For. Fl.* ii. 302. T. Baula, *Herb. Ham.* Cylicodaphne nitida, *Meissn. in DC. Prodr.* xv. 1. 203.

EASTERN HIMALAYA; Bhotan, *Griffith.* ASSAM, near Goalpara, *Hamilton.* SILHET, *Wallich.* PEGU, at Rangoon, *Wallich, M'Clelland.*

A timber tree; branchlets woody, angular, bark pale. *Leaves* 2–3 in. broad, much narrowed towards the base, pale brown when dry, above smooth with slender raised nerves; petiole ½–⅔ in., stout. *Male racemes* axillary and below the leaves, numerous, rachis and pedicels very slender, the latter often ⅜ in.; umbels quite glabrous; bracts rather membranous; flowers sessile. *Perianth-tube* turbinate, silky; sepals 4 nearly glabrous, very unequal. *Stamens* about 14, filaments slender hairy. *Female racemes* 1 in. long; umbels shortly pedicelled; flower not seen. *Fruit* (unripe) apparently sunk in the globose or at length hemispheric smooth perianth-tube, which with its short pedicel is about ½ in. long; edge of mouth thin, obscurely lobed; ripe fruit "oblong 6–7 lines long seated in the 3–5-cleft large fleshy cup," *Kurz*.—The raised nerves of the upper surface of the dried leaves is in contrast to those of the three last species.

53. **L. Maingayi,** *Hook. f.*; quite glabrous except the umbels, leaves 7–16 in. alternate very long-petioled penninerved rigidly coriaceous oblong or oblanceolate obtuse or acute, nerves 10–18 pair strong beneath with transverse nervules, male umbels in racemes 5–6 in. long hoary 6-fld. long-pedicelled.

MALACCA, *Maingay* (*Kew Distrib.* 1264, 1273).

Branches woody, bark blackish when dry. *Leaves* 2–5 in. broad, brownish and shining above with impressed nerves, paler beneath and finely reticulated between the rather distant nervules; base narrowed; petiole 2 in., slender. *Racemes* from below the leaves, numerous; rachis rather slender, arched or drooping, nearly glabrous; umbels in bud globose, ⅓ in. diam., expanded ½–¾ in. diam.; bracts 4, coriaceous, concave, subequal, white and hoary; pedicel ⅙–⅓ in. long; flowers pedicelled. *Perianth* with a funnel-shaped tube, tomentose, sepals 6–8. *Stamens* about 12, filaments long slender glabrous; anthers linear-oblong. *Ovary* sunk in the tube of the perianth (imperfect). *Fruit* unknown.

54. **L. Panamonja,** *Ham. in Wall. Cat.* 2553 (Tetranthera); quite glabrous except the tomentose racemes, leaves 5–12 in. alternate penninerved coriaceous oblong or lanceolate acuminate reticulate beneath between the 10–12 pair of slender nerves, male umbels in racemes 5–7 in. long 6-fld. long-pedicelled, female in shorter racemes. Tetranthera Panamonja, *Ham.*; *Meissn. in DC. Prodr.* xv. 1. 197; *Kurz For. Fl.* 302. T. Panamanja, *Nees in Wall. Pl. As. Rar.* ii. 67, and *Syst. Laurin.* 561 and 677; ? *Wight Ic.* t. 1836.

ASSAM Plains, *Wallich*, &c. TENASSERIM frequent, *Griffith*, *Kurz*.

A large tree; young shoots puberulous. *Leaves* firmly coriaceous, 2–3½ in. broad, pale brown when dry, rarely oblanceolate, base acute or cuneate; petiole ½–1 in. *Racemes* solitary or in pairs from below the leaves, slender, drooping; umbels in bud globose, ⅙–¼ in. diam., tawny-tomentose; pedicels ⅙–½ in.; bracts 4, subequal, coriaceous, concave; flowers 6, sessile. *Perianth* tomentose, tube funnel-shaped; sepals 6, oblong. *Stamens* hirsute at the base. *Stigma* dilated. "*Fruit* broader than long, almost didymous, size of a pea, 2-*seeded*, seated on an entire small cup-like expansion of the perianth-base," *Kurz*.—The description of the fruit is from Kurz; that it is called 2-seeded is no doubt an oversight. The Tenasserim specimens (var. β. *longiracemosa*, Meissn. l. c.) have longer racemes and larger flowers than the Assam ones. In Herb. Wight there is a plant in very young flower, figured in his Icones (t. 1836), from Courtallam, called *T. Panamanja*, which differs much in habit from that species. The leaves are very coriaceous elliptic acute shining above, petiole ¾ in.

55. **L. oleoides,** *Meissn. in DC. Prodr.* xv. 1. 195 (Tetranthera); quite glabrous except the tomentose racemes, branches very stout, leaves 3–4 in. alternate penninerved very coriaceous elliptic tip obtuse or rounded base acute beneath not glaucous faintly reticulate with 8–10 pair of slender nerves, petiole stout, male racemes short erect, umbels shortly pedicelled, fruit globose seated on the broad turbinate subsessile perianth-tube.

NILGHIRI MTS.; at Sispara, *Wight*, *Gardner*.

Apparently a robust shrub, or tree, with erect leaves greenish above and hardly glaucous beneath, and branches as thick as a goose-quill. The very young racemes are axillary, erect, 1 in. long, with a stout rachis and very shortly stoutly pedicelled umbel, much too young for analysis. *Fruiting racemes* 1–2 in. long, rachis stout, pedicels of umbels short and thick; pedicel and perianth-tube together forming a broadly obconic or turbinate cup ½–⅝ in. diam. with an entire or lobed thin margin.—Meissner describes this as having opposite or subopposite leaves, but I find them opposite only on very young shoots. Possibly an extreme form of *L. Wightiana*.

56. **L. Stocksii**, *Hook. f.*; glabrous except the silky-tomentose inflorescence, leaves 4–6 in. alternate penninerved coriaceous oblong-lanceolate or oblanceolate rarely obovoid acute or acuminate, glaucous and very finely but distinctly reticulate and sometimes puberulous beneath with 10–16 pairs of strong nerves, fem. umbels 6–8-fld. in stout suberect racemes 1–3 in. long, fruit ellipsoid seated on the entire or irregularly lobed turbinate thickly pedicelled perianth-tube. Tetranthera lanceæfolia, *Grah. Cat. Bomb. Pl.* 174. ? T. glauca, δ. ? lævigata, *Nees Syst. Laur.* 677; *Meissn. l. c.* 185. C. myristicæfolia, *var.* acutata, *Meissn. l. c.* 209 (*the Canara plant only*).

The CONCAN and CANARA; on the Ghats and Mahableshwar Hills, *Gibson*, *Stocks*, *Ritchie*, &c.

Branches stout. *Leaves* ½–2 in. broad, often of a purplish or brown glaucous hue beneath, greenish above with impressed nerves; petiole ⅓–½ in. *Female umbels* shortly pedicelled, flowering nearly ⅓ in. diam.; bracts 4, and flowers silvery silky. *Perianth-tube* oblong-turbinate in flower; stamens (of female) reduced to the 2 glands and a ligule. *Fruiting umbels* sometimes solitary or corymbose; fruit (unripe) ½ in. long; perianth-tube nearly ½ in. diam.—It is with great hesitation that I advance this as distinct from *L. Wightiana*, and on the other hand I am not quite satisfied whether or no *L. Stocksii* may not include two species, or that the synonymy of the three following forms is absolutely correct. Meissner evidently had the same difficulty as I have experienced in respect of these Litsæas.

1. *Stocksii proper*; leaves very minutely puberulous beneath.—Along with ellipsoid-fruiting specimens of this from near Parwar Ghat, Ritchie sends detached fruits which are transversely oblong, 1 in. diam. Tetranthera oblonga, *var.* Stocksii, *Meissn. in DC. Prodr.* xv. 1. 205.

2. Var. *acutata*; leaves quite glabrous and more glaucous beneath, but reticulated as in *Stocksii proper*. Cylicodaphne myristicæfolia, *var.* acutata, *Meissn. l. c.* 209, *in part*. Tetranthera lanceæfolia, *Roxb.* ?; *Grah. Cat. Bomb. Pl.* 171.

3. Var. *glabrescens*; leaves obovate-oblong rarely lanceolate very white and glaucous beneath with no or very obscure traces of reticulation.—Cylicodaphne Wightiana, *var.* glabrescens, *Meissn. l. c.* 20[illegible] (the plant of Stocks), and *var.* acutata, *Meissn. l. c.* 515.—Canara, *Stocks*. Nilghiri Hills, at Villa Cadoo, *Wight*.

†† *Leaves more or less pubescent beneath* (*sometimes glabrous in* L. Gardneri).

57. **L. Gardneri**, *Thwaites Enum.* 255 (Tetranthera); nearly glabrous, branches robust, leaves 4–6 in. alternate penninerved thickly coriaceous oblong or broadly elliptic obtuse glabrous or hoary beneath with 8–10 pair of very strong nerves and transverse nervules reticulations very obscure, racemes short tomentose with stout rachis and pedicels, bracts silky, fruit oblong seated on a broad turbinate stoutly pedicelled perianth-tube. Cylicodaphne zeylanica & rigida, *Meissn. in DC. Prodr.* xv. 1. 201.

CEYLON; Central Province, alt. 4–6000 ft., *Thwaites*.

A tree, 40–50 ft.; branches as stout as a goose-quill. *Leaves* 1½–4 in. broad, brown when dry above with impressed nerves, paler beneath but not glaucous; base acute; petiole ¼–⅓ in., stout. *Racemes* 1–3 in. long, strict; pedicels ¼–⅓ in.; umbels

5-fid., ⅓ in. diam. when flowering; flowers silky. *Perianth* turbinate, glabrous within, 4–6-partite. *Stamens* usually 9. *Fruit* nearly globose, ⅓–½ in. broad (Thwaites); perianth-tube with the very thick pedicel ¾–1 in. long, and ½ in. diam.—Quite possibly a form of *L. Wightiana.* The flowers according to Thwaites are polygamous.

58. **L. Beddomei,** *Hook. f.*; branchlets midrib beneath and racemes pubescent, leaves 2–3 in. alternate penninerved coriaceous linear-oblong or lanceolate obtuse acute or acuminate silvery glaucous beneath with 8–10 pair of very faint and slender nerves, male racemes 1–2 in., bracts silvery 4-fid.

SOUTH DECCAN; Tinnevelly Hills, *Beddome.*

Apparently a small bush; branches scarred. *Leaves* ½–¾ in. broad, smooth and greenish above when dry with very faint nerves, obscurely reticulate beneath. *Racemes* 1–2 in., or less; pedicels ¼ in., male umbels ¼ in. diam. in flower; bracts coriaceous. *Perianth-tube* pubescent, lobes 6 membranous. *Stamens* 8; filaments short, glabrous.—A very distinct-looking small species, of which the specimens are insufficient for a full character.

59. **L. Wightiana,** *Wall. Cat.* 2557 (Tetranthera); branchlets leaves beneath and inflorescence more or less rusty-tomentose or villous, leaves 3–9 in. alternate penninerved coriaceous from oblong to elliptic-lanceolate obtuse acute or acuminate, brown beneath with 8–12 pair of strong nerves and reticulations, racemes stout 1–4 in., umbels stoutly pedicelled silky large 4–6-fid., fruit ½ in. seated on the turbinate or hemispheric stoutly pedicelled entire or 6-toothed perianth-tube. Cylicodaphne Wightiana, *Nees in Wall. Pl. As. Rar.* ii. 68 and iii. 31; *Meissn. in DC. Prodr.* xv. 1. 200 and 515 (*excl. var. β. and γ.*); *Dalz. & Gibs. Bomb. Fl.* 222. ? C. floribunda, *Blume Mus. Bot.* i. 387; *Meissn. l. c.* Tetranthera Wightiana, *Bedd. Fl. Sylv.* 293.

Nilghiri and Travancore Hills, alt. 6–8000 ft., *Wight*, &c. CANARA, *Stocks, Dalzell.*

A rather large tree (Wight); branches robust. *Leaves* very variable in size and breadth, usually greenish above with impressed veins and light or dark brown beneath, rarely purplish and glaucescent; base acute; petiole ½–¾ in., stout. *Racemes* suberect or spreading, rachis stout; pedicels ¼–⅓ in., stout; umbels ⅓–⅔ in. broad when flowering; bracts 4, coriaceous. *Perianth* turbinate, tube and 6 lobes silkily tomentose. *Stamens* about 12, filaments hairy. *Stigma* discoid. *Fruit* as in *L. Stocksii*, but in the Canara specimens the mouth of the perianth-cup has 6 remote erect or spreading teeth.—I have under *L. Stocksii* and *Gardneri* stated my suspicions that they are forms of this very variable plant, as may be *L. ovalifolia.* Meissner's vars. *tomentosa* and *parvifolia* have no certain characters; his locality of Assam is founded on an erroneous label, and that of Ceylon refers to *L. Gardneri.*

60. **L. cordata,** *Jack in Mal. Misc. ex Calc. Journ. Nat. Hist.* iv. 356; branchlets leaves beneath and racemes rusty-tomentose, leaves 4–6 in. alternate penninerved thinly coriaceous broadly ovate-oblong cordate acute or acuminate, nerves 10–12 pair spreading with transverse nervules beneath, racemes slender axillary and in terminal panicles drooping, umbels 6–8-fid. Tetranthera cordata, *Jack ex Meissn. in DC. Prodr.* xv. 1. 196. T. cordifolia, *Meissn. l. c.* T. Perrottetii, *Blume Mus. Bot.* 384; *Meissn. l. c.*

MALACCA, *Griffith.*—DISTRIB. Sumatra, Philippines.

Branches black when dry. *Leaves* 3–4 in. broad, brown when dry and polished above with raised nerves and nervules, base always cordate, sometimes unequal; petiole ⅓–¾ in., rather slender. *Racemes* 1–4 in., slender; pedicels ¼ in.; umbels in flower ⅓ in.; bracts 4, nearly glabrous; flowers villous. *Sepals* 6. *Filaments* hirsute. *Fruit* in Philippine specimens ½–¾ in. long, ellipsoid, seated on the turbinate shortly thickly pedicelled perianth-tube, which is about ⅛ in. diam. at the mouth.—Meissner's locality of "Penins. Ind. Or., Wight," is erroneous. Wight's specimen is from Griffith.

Sect. V. **Neolitsæa,** *Benth.* *Leaves* persistent, alternate, triple-nerved, sometimes subverticillate. *Umbels* in sessile clusters. *Perianth-segments* usually 4, deciduous, tube not or rarely enlarged in fruit. *Stamens* usually 6. *Fruit* small.—LITSÆA, *Nees, Meissner.* TETRADENIA, *Nees.* (I think *Tetradenia,* Nees, should be restored as a genus.)

61. **L. lanuginosa,** *Nees Syst. Laurin.* 634; leaves 5–12 in. alternate and whorled elliptic-lanceolate or oblanceolate acuminate triple-nerved softly thinly tomentose beneath soon glabrous and glaucous, bracts and flowers silkily villous, fruit oblong. *Meissn. in DC. Prodr.* xv. 1. 221; *Brand. For. Fl.* 382; *Gamble Man. Ind. Timb.* 312. Tetranthera lanuginosa, *Wall. Cat.* 2561. T. Cuipala, *Don Prodr.* 65. Tetradenia lanuginosa, *Nees in Wall. Pl. As. Rar.* ii. 64. L. ? Cuipala, *Nees and Meissn.*

Outer HIMALAYA; from Kashmir, alt. 3000 ft., to Sikkim, alt. 6000 ft. (very rare in Garwhal). KHASIA MTS., *Herb. Griffith.*

A small tree, terminal buds often 1 in. long. *Leaves* variable in size, young densely clothed with long soft shining silky hairs, often 8–10 in a terminal whorl; basal nerves usually produced far beyond the middle, others 3–4 pair; petiole ¼–¾ in. *Umbels* in clusters nearly 1 in. diam., 4-fld., male fl. shortly pedicelled, fem. longer pedicelled. *Filaments* of inner stamen with long-pedicelled glands. *Fruit* ½ in. long acute at both ends, pedicel thickened at the top but not swollen upwards.—I think this is certainly Don's *Tetr. Cuipala.*

62. **L. fuscata,** *Thwaites Enum.* 258; leaves 3–4 in. alternate and whorled coriaceous elliptic acuminate triple-nerved, beneath white or pale brown with appressed hairs at length glaucous, bracts and flowers villously silky or tomentose, fruit globose on the much-thickened funnel-shaped perianth-tube. *Meissn. in DC. Prodr.* xv. 1. 221.

CEYLON; Central Province, alt. 6–8000 ft., *Walker,* &c.

A tree, 20 ft.; branchlets rusty-tomentose. *Leaves* 1½–2 in. broad, smooth above, youngest densely clothed with silky hairs; petiole ½–1 in. *Clusters* of male fl. ¾ in. broad; flowers shortly pedicelled. *Filaments* laxly hairy; glands of inner subsessile. *Fruit* ⅓ in. diam., pedicel ¾–1 in. long.—Beddome (Forest Manual) regards this, *L. orbicularis* and *umbigua* as vars. of *L. zeylanica,* but to me they appear all very distinct.

63. **L. zeylanica,** *C. & Fr. Nees in Amœn. Bot. Bonn. Fasc.* i. 58, t. 5, *ex Nees Syst. Laurin.* 626 (ceylanica); quite glabrous or branchlets and petioles faintly puberulous, leaves alternate 3–5 in. elliptic- or oblong-lanceolate obtusely or acutely acuminate triple-nerved with 1–3 pairs of nerves above the middle glaucous or not beneath, bracts and flowers silky, fruit subglobose or oblong seated on a disciform perianth-tube with a thickened pedicel. *Meissn. in DC. Prodr.* xv. 1. 226; *Blume Mus. Bot.* i. 346; *Brand. For. Fl.* 382; *Dalz. & Gibs. Bomb. Fl.* 223; *Gamble Man. Ind. Timb.* 311; *Thwaites Enum.* 257; *Beddome Fl. Sylv.* t. 294; *Wight Ic.* t. 132 and 1844. L. oblonga, *Nees Syst. Laurin.* 678; *Wight Ic.* t. 1845. L. striolata, *Blume l. c.* 347; *Meissn. l. c.* 223. L. foliosa, *Nees l. c.* 622; *Meissn. l. c.* 222 (*excl. var. β.*); *Kurz For. Fl.* ii. 306. L. furfuracea, *Nees l. c.* 625; *Blume l. c.* 347; *Miquel Fl. Ind. Bat.* i. 975. L. scrobiculata, *Meissn. l. c.* 233. L. trinervia, *Juss. in Dict. Sc. Nat.* xxvii. 79. Tetradenia ceylanica, furfuracea & foliosa, *Nees in Wall. Pl. As. Rar.* ii. 64 and iii. 30. Tetranthera foliosa, pulcherrima (*in part*) & furfuracea, *Wall. Cat.* 2563,

2567, 2568. Laurus Cassia, *Linn. ex Wight in Hook. Journ. Bot.* ii. (1840) 386. L. involucrata, *Vahl in Herb. Juss. ex Lamk. Dict.* iii. 445; *Roxb. Cor. Pl.* ii. 46, t. 187. L. zeylanica, &c., *Herm. Mus. Zeyl.* 26.

BHOTAN and the KHASIA MTS., *Griffith.* SILHET, *Wallich.* CHITTAGONG, Pegu and Tenasserim, ascending to 7000 ft., and Martaban, *Kurz.* MALACCA, *Maingay*; on Mt. Ophir and in littoral woods at Tangong chi, *Griffith.* PENANG, *Wallich.* DECCAN PENINSULA; on the Western Ghats from the Concan southwards, and from Quilon on the coast, *Wight*, ascending to 7000 ft. on the Nilghiris. COROMANDEL, on the coast hills, *Roxburgh.* CEYLON, ascending to 6000 ft.—DISTRIB. Sumatra, Java.

A small tree, variable as to foliage. *Leaves* often caudate-acuminate, 7 by 3½ in. the largest specimens from Courtallam and Sumatra (*L. latifolia*, Blume), smooth above or beautifully reticulated with minute impressions on one or both surfaces wholly or in part; petiole ½–2 in. long. *Umbels* 4–5 fld. in all the specimens I have examined, and as figured by Roxburgh (6–12 fld., Brandis, by error I suspect). *Fruit* globose and subglobose, ¼–⅓ in. diam., or oblong and ½–¾ in. long; pedicel much thickened, ⅓–⅔ in. long.—I am in doubt as to there being one or two species included in the above: one has globose fruit, mammillate at the top, as figured by Roxburgh, and in Wight's Icones, t. 132, from Ceylon, and his *L. oblonga*, t. 1845, from Courtallam, and which I have seen in specimens from Canara, the Nilghiris and Malacca; the other species with much larger oblong fruit, rounded at the top, as figured by Wight also as *L. zeylanica* at t. 1844, for which he gives no precise locality (beyond that it is a native of Ceylon, Martaban and the western slopes of the Nilghiris), and as figured by Beddome, t. 294, and of which I have seen specimens from the Concan? (Herb. Dalzell). Brandis describes the fruit of *zeylanica* as globose but occasionally ovoid, and they are oblong in Nees' description of *zeylanica*, *furfuracea* and *oblonga*, and Meissner's of *foliosa* var. *cæsia.* Kurz describes the Burman *foliosa* as having oblong fruit; and Meissner his *zeylanica* var. *venosa* as "ovali-globosa." Unfortunately I find no fruit amongst the many Ceylon specimens that I have examined.—With regard to the characters ascribed by authors to *furfuracea*, *oblonga*, *scrobiculata*, *foliosa* and *pulcherrima*, I find nothing in these whereby to distinguish them from *zeylanica*; nor are Meissner's five varieties of the latter at all fixed. For the distinctive characters of the too-closely allied *L. umbrosa*, I must refer to the notes under that species.

64. **L. umbrosa,** *Nees Syst. Laurin.* 623 (Tetranthera); branchlets slender pubescent, leaves 2–5 in. alternate elliptic or oblong-lanceolate caudate-acuminate triple-nerved below and with usually 2–4 pair of strong nerves above the middle glaucous or not beneath, fruit globose on a very slightly enlarged perianth-tube with a slender pedicel. *Meissn. in DC. Prodr.* xv. 1. 223. L. consimilis, *Nees Syst.* 628 (*excl. syn. Laurus involucrata*); *Meissn. l. c.* 223; *Gamble Man. Ind. Timb.* 311. Tetradenia umbrosa and T. consimilis, *Nees in Wall. Pl. As. Rar.* ii. 64 and iii. 30 (*excl. var.* β.). Tetranthera umbrosa, *Wall. Cat.* 2564, and pulcherrima? 2567 B. T. pallens, *Don Prodr.* 66.

TEMPERATE and SUBTROPICAL HIMALAYA; Kashmir and Chumba, alt. 3–5000 ft., *Clarke*; Simla and Kumaon, alt. 6–7000 ft.; Nepal, *Wallich.* Sikkim, alt. 7000 ft., KHASIA MTS., alt. 5–6000 ft.—DISTRIB. Munnipore.

Habit and characters of *L. zeylanica*, but usually more slender, with more caudate leaves, and best distinguished by the longer more slender fruiting-pedicels with a smaller dilated perianth-tube under the fruit. There are three forms which I have endeavoured to characterize below, of which the larger leaved Khasia may be the transition to *zeylanica*, with which Brandis unites both *L. umbrosa* and *consimilis*, probably rightly. Gamble, however, keeps them distinct. *L. consimilis* was founded by Nees on Wallich's flowering specimen of *pulcherrima*? (No. 2567 B), which he identified doubtfully with Roxburgh's Coromandel *Laurus involucrata*, assuming that they were from the same mountains; and in so far as that Roxburgh figures many pairs of nerves above the basal, he had some reason for his assumption; but in other respects, as in locality, Roxburgh's *involucrata* is better referred to *zeylanica*. Leaves with transversely striolate nervules occur in all forms.

L. umbrosa proper; leaves small elliptic rarely 3 by ¾–1 in., nerves 2–3 pair above the basal, fruit globose. L. umbrosa β. khasiana, *Meissn. in part*.—Khasia Mts., alt. 5–7000 ft.

Var. *impunctata*; leaves larger broader 3–6 by 1½–2½ in. L. umbrosa β. khasiana, *Meissn. in part*, and L. foliosa *var.* impunctata, *Meissn.*, with oblong fruit, from Khasia, alt. 5–7000 ft., and L. striolata, *Meissn.*, with globose fruit, from Sikkim, alt. 7000 ft.

Var. *consimilis*; leaves more membranous oblong-lanceolate 3–5 by 1–1½ in. often more glaucous beneath with usually many pairs of nerves above the basal, fruit globose.—Kashmir to Nepal.—There is a good specimen of this in Herb. Hooker, received from Wallich in 1821, but it is not in the Wallichian Herbarium of the Linnæan Society.

65. **L. Mannii**, *King in Herb. Calcutt.*; branches slender and petioles and pedicels pubescent, leaves scattered 2–3 in. triple-nerved elliptic-lanceolate obtusely caudate-acuminate minutely impressed punctate on both surfaces nerves beneath very slender, fruiting clusters sessile, fruit minute globose mucronate seated on the remains of the unaltered perianth.

KHASIA or JYNTEA HILLS, *G. Mann*.

The small leaves with faint nerves and small mucronate fruit about ⅛ in. diam. well distinguish this species, which may be a *Litsæa* as Dr. King has named it, but without bracts and flowers it is impossible to say that it is not an *Actinodaphne* or *Lindera*.

DOUBTFUL SPECIES.

LITSÆA? species, from Upper Assam, Mishmi Hills at Choonpara, *Griffith*. Leaves only; these resemble *L. Wallichii* in form, in the bright red-brown coriaceous shining surfaces covered with fine reticulations, but differ in having 20–30 pairs of nerves; they are 12–18 by 5–9 in., oblong, subacute or acuminate, shortly petioled, and as well as the branches perfectly glabrous.

L. VELUTINA, *Blume Mus. Bot.* i. 376; *Meissn. in DC. Prodr.* xiv. 1. 181; from India, *Heyne*.—It is impossible from the meagre description to say what this may be.

LITSÆA rugosa, *Kurz in Flora* 1872, 171 (Tetranthera? ochrascens, *Miquel Fl. Ind. Bat. Suppl.* i. 146, 363. Sideroxylon? rugosum, *Wall. Cat.* 4158. S. Wallichianum, *G. Don Gen. Syst.* iv. 28; *DC. Prodr.* viii. 185), from Penang.—Wallich's specimens have neither flower nor fruit, and do not resemble any *Litsæa* known to me. Miquel's *Tetranthera? ochrascens* is a Sumatran plant described from specimens without flower or fruit. Wallich's *S. ? rugosum* was overlooked when the genus was worked up for Vol. III. of this Flora.

LEPIDADENIA Wightiana, *Nees Syst. Laurin.* 583; *Wight Ic.* t. 1837. Tetranthera Roxburghii, *Hassk. Pl. Jav.* 243, *excl. syn.* (*fid. Miquel*).—This is correctly referred by Meissner to Blume's (not Persoon's) *L. sebifera* (Cylicodaphne sebifera, *Blume in DC. Prodr.* xv. 1. 202). Wight's figure is taken from a single bad specimen without locality, and it so precisely accords with Javanese ones, that I cannot without further evidence believe it to be from the Nilghiris, where Wight supposes he once gathered it, but where neither he nor any other collector has since found it.

LAURUS umbellata, *Ham. in Don Prodr.* 64, from Nepal.—Meissner (*in DC. Prodr.* xv. 1. 258) doubtfully suggests this being *L. tomentosa* or *laurifolia* (*sebifera*, Pers.), but the description is far too meagre to admit of any identification. The anthers should be 2-celled, for Don keeps it in *Laurus*.

12. DODECADENIA, *Nees.*

Evergreen trees. *Leaves* scattered, coriaceous, penninerved; buds perulate. *Flowers* 2-sexual, subsolitary or 2–3 together, subsessile or panicled and pedicelled, each with 4–5 imbricating bracts. *Perianth-tube* short; segments 6–9, subequal, spreading. Perfect *stamens* 10–15; filaments slender, of 1st and 2nd series eglandular, of 3rd and 4th 2-glandular; anthers all 4-celled, introrse. *Fruit* seated on the dilated thick flattish perianth-tube, stoutly pedicelled.

1. **D. grandiflora,** *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 588; branchlets and young leaves silky-tomentose, leaves elliptic-lanceolate acuminate, flowers subsolitary, ovary hirsute. *Meissn. in DC. Prodr.* xv. 1. 210; *Brandis For. Fl.* 381; *Kurz For. Fl.* ii. 304. Tetranthera grandiflora, *Wall. Cat.* 2544. ? Laurus macrophylla, *Don Prodr.* 64.

TEMPERATE HIMALAYA; Kumaon, alt. 8000 ft., *Blinkworth*, &c. BURMA, on the Khakyen Hills, *Kurz*. Nepal, *Wallich*.

Branches rugged, shoots subsilkily tomentose. *Leaves* 3–4 in. (rarely 6–8), thinly coriaceous, minutely reticulate on both surfaces, opaque beneath; nerves 6–8 pair, very slender; petiole ¼–⅜ in., slender, young tomentose. *Flowers* ⅓ in. diam.; pedicels very short, covered with the scars of bracts which are oblong silky ⅛ in. long. *Perianth-segments* oblong, obtuse, hoary within. *Filaments* slender, exserted, villous. *Ovary* hirsute; stigma oblique, lobulate. *Fruit* ½ in. long, ellipsoid; peduncle stout, ¼ in.; perianth-tube discoid, ¼ in. diam., entire.—Meissner (in DC. Prodr. xv. 1. 258) suggests this being Don's *Laurus macrophylla*, but Don's description is too meagre to admit of any identification.

2. **D. Griffithii,** *Hook. f.*; branchlets glabrous, leaves elliptic-lanceolate acuminate, flowers subsolitary, ovary glabrous, style hirsute.

BHOTAN, *Griffith* (*Kew Distrib.* 4312).

Very similar to *D. grandiflora*, but the branchlets and ovary are quite glabrous, and the leaves much more strongly reticulate between the nerves beneath. I have seen no fruit.—*Bracts* 7 to each flower. *Sepals* 6, coriaceous, oblong, obtuse, silky without, glabrous within; tube turbinate. *Stamens* 10, filaments all villous; 4 of the longer eglandular; 2 of the longer 2-glandular; 4 short ones 2-glandular.

3. **D. ? paniculata,** *Hook. f.*; quite glabrous, leaves elliptic-ovate or oblong acute or acuminate coriaceous, flowers in axillary panicles long-pedicelled, ovary glabrous. Tetranthera chartacea, *Meissn. in DC. Prodr.* xv. 1. 186 (the Sikkim plant only).

SIKKIM HIMALAYA, *J. D. H.*; at Mik, alt. 3000 ft., *Clarke*. BHOTAN; in woods at Sasee, *Griffith*.—DISTRIB. Munnipore.

A small tree, 40 ft. (Clarke); branches quite smooth and glabrous, rather slender. *Leaves* 5–9 by 2–2½ in., coriaceous, pale brown and rather shining above, beneath more or less glaucous or white, base acute cuneate or rounded; nerves 5–10 pairs, reddish, transverse nervules and reticulations distinct; petiole ⅓–½ in., rather stout. *Panicles* 1½–2 in. long, axillary, spreading; branches stiff spreading with often 3 terminal flowers; pedicels ⅛ in., stiff, thickened at the tip; flowers ⅓ in. diam., apparently 2-sexual. *Sepals* rounded oblong, glabrous, spreading and recurved, connate at the base and separating together early from the pedicel, hispid at the base within. *Stamens* 8–10, filaments and anthers hispidulous, alternate ones shorter, all shorter than the sepals; anthers oblong, 4-celled, introrse. *Staminodes* about 20. *Fruit* 1–1½ in. long, clavately obovoid, ⅓–½ in. broad below the rounded top; pedicel thickened into the obconic truncate calyx-tube, which is about ⅓ in. diam., drooping.—A very curious plant, which I hesitatingly put into *Dodecadenia*. Meissner included it under *Tetranthera*, and in Herb. Hook. has labelled it *T. chartacea*, Wall.? *β. areolata*. The bracts are evidently caducous, for all are gone. Griffith in his Itinerary Notes, p. 113 (n. 404), calls it a *Tetranthera*, and describes it as a large tree. In the absence of bracts it is not possible to say it is not a *Tetranthera*, but it resembles no other, and the flowers are quite like those of a *Dodecadenia*.

13. **LINDERA,** *Thunb.*

Shrubs or trees, often deciduous. *Leaves* alternate or subopposite, penni- or 3–5-nerved; buds perulate or naked. *Involucres* 4–6- or more-fld., sessile or pedicelled, fascicled or racemose; bracts 2–5. *Flowers* diœcious, pedicelled, umbellate or capitate. *Perianth-tube* very short; segments 7–9, subequal, small, petaloid. *Stamens* usually 9, 3-seriate, filaments narrow, of 1st and 2nd series eglandular, of 3rd (rarely of 2nd) 2-glandular; staminodes in fl. ♀ 9; anthers 2-celled, all introrse. *Fruit* globose or ovoid, seated on the unaltered or disciform entire or 6-toothed perianth-tube.—Species about 60, Tropical and Eastern Asia and N. America.

I follow Bentham (in Gen. Plant.) in bringing together under one genus all the Indian 1-celled *Litseaceous* plants, and have for the most part arranged them under the sections he has proposed. I expect, however, that when more complete specimens of this group are available, several of the genera now included under *Lindera* will be restored much upon the lines I here indicate as sections.

Sect. I. **Aperula.** *Leaves* persistent, penninerved. *Umbels* long-pedicelled; bracts 4, involucriform, 6–12-fld. *Stamens* 9.

1. **L. assamica,** *Kurz For. Fl.* ii. 308; branchlets and leaves beneath rusty- or tawny-hirsute and pubescent, leaves persistent 4–6 in. lanceolate or elliptic-lanceolate acuminate penninerved, umbels 6–9-fld., pedicels slender solitary or fascicled on a short common peduncle, bracts 4 glabrous, fruit subglobose. Aperula assamica, *Meissn. in DC. Prodr.* xv. 1. 240. *in part.* A. Meissneri, *Herb. Calcutt.*

EASTERN HIMALAYA; Bhotan, *Griffith* (*Kew Distrib.* 4316); Sikkim, alt. 7–9000 ft., *J. D. H.*, &c. MARTABAN HILLS, on the Nettoung, *Kurz*.

A small tree or shrub, 10–30 ft.; shoots finely pubescent. *Leaves* 1–2 in. diam., coriaceous, smooth above with impressed nerves, beneath with 6–10 pairs of strong nerves cross-nervules and reticulation, base very acute; petiole ¼–⅓ in. *Umbels*, male about ⅓ in. diam. when in flower; pedicel ½–1 in., very slender, nearly glabrous; flowers on slender silky pedicels ¼–⅓ in.; fem. umbels smaller with shorter pedicels and shorter pedicelled flowers; bracts hemispheric. *Sepals* 6, subequal. *Stamens* 9, filaments hairy, 3-inner 2-glandular. *Fruit* nearly ½ in. long.—Foliage a good deal like that of *Litsæa elongata*.

2. **L. Meissneri,** *King mss.*; glabrous except the silky inflorescence, leaves persistent 2–3 in. ovate or ovate-lanceolate caudate-acuminate with 5–8 pair of very slender nerves, umbels about 9-fld., pedicels very slender racemed on a slender common peduncle, bracts 4 membranous. Aperula assamica, *Meissn. in DC. Prodr.* xiii. 1. 240, *in part.*

ASSAM; on the Nuku Hills, *Simons*.

Closely allied to *L. Meissneriana*, but the branchlets are smooth and bark as in *L. oxyphylla*, the leaves are glabrous, much smaller, more ovate, caudate-acuminate and hardly reticulate beneath, the petioles more slender and the umbels smaller.—The specimen is a solitary one in male fl. Meissner is mistaken in uniting it with Griffith's 1171, and giving Jenkins as its collector. It is one of several curious plants found by Simons in the Nuku Hills, where no one has since collected that I know of. King (in Herb. Calcutt.) observed that Meissner has included two species under his *A. assamica*, and suggested the name of *Meissneri* for one of them.

3. **L. malaccensis,** *Hook. f.*; glabrous except the sparsely pubescent inflorescence, leaves 3–5 in. coriaceous broadly ovate or elliptic-ovate or lanceolate shortly acuminate shining above with 4–6 pair of impressed nerves which are strong beneath with faint cross-nervules, umbels 4–9-fld. small very numerous, pedicels clustered on a short stout common peduncle, bracts 4, fruit globose. Tetranthera Griffithii, *Meissn. in DC. Prodr.* xv. 1. 191.

MALACCA, *Griffith* (*Kew Distrib.* 4297), and Singapore, *Maingay* (*Kew Distrib.* 1257, 1272).—DISTRIB. Borneo.

Branches black, terete, smooth. *Leaves* 2–3 in. broad, dark brown, paler and opaque beneath, base acute or cuneate; petiole ½–¾ in. *Umbels* very numerous, unexpanded ⅓ in. diam., on rather stout pedicels ¼–½ in. long; bracts hemispheric, coriaceous; flowers villous. *Sepals* unequal. *Stamens* 9, villous at the base. *Fruit* ⅓ in. diam.—I have seen many specimens of both sexes, but none with expanded flowers.

4. **L. latifolia,** *Hook. f.*; branches leaves beneath and umbels densely grey-tomentose, leaves persistent 5–8 in. obovate oblong or broadly oblanceolate subacute or acuminate with 10–12 pair of nearly straight nerves deeply sunk above, umbels 10–12-fld. solitary clustered or fascicled on a very short peduncle, bracts 4, fruit globose small.

KHASIA MTS., alt. 5–6000 ft., at Nunklow, Myrung and Pomrang, *Griffith* (*Kew Distrib.* 4321); *J. D. H. & T. T.* Nyrmai, *Clarke.*

A small tree. *Leaves* membranous, 3–5 in. diam., reticulate beneath with cross-nervules, base acute; petiole tomentose, ¼–⅓ in. *Umbels* unexpanded ⅓ in. diam. on rather stout tomentose pedicels; bracts hemispheric, tomentose. *Sepals* 6, broad. *Stamens* 9, filaments hairy. *Fruit* the size of a pea.—Some large-leaved specimens have the nerves more arched.

5. **L. oxyphylla,** *Benth. in Gen. Pl.* iii. 163; glabrous except the hoary umbels, leaves 3–4 in. elliptic-lanceolate acuminate subglaucous beneath penninerved, nerves very obscure, umbels 9–14-fld. in subsessile clusters shortly pedicelled, bracts 4. Aperula oxyphylla, *Meissn. in DC. Prodr.* xv. 1. 240. Daphnidium oxyphyllum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 618. Tetranthera oxyphylla, *Wall. Cat.* 2547.

PENANG, *Porter.*

Branches stout, black when dry, smooth, quite glabrous. *Leaves* rather coriaceous, 1–1⅓ in. broad, smooth above with about 12 pair of very slender raised nerves which are with difficulty seen beneath, base acute; petiole ⅓–½ in. *Umbels*; male, unexpanded, ¼ in. diam.; bracts hemispheric. *Sepals* 4–6, unequal. *Stamens* 9. *Fruit* unknown.—Wallich's specimens are the only ones seen; it approaches *L. citriodora* of China, and very much resembles *L. Kingii.*

Sect. II. **Polyadenia.** *Leaves* persistent (except perhaps *L. venosa*), penninerved. *Umbels* sessile or subsessile. *Bracts* 4–8, involucriform or imbricate. *Stamens* 9–12. § POLYADENIA & CEPHALODAPHNE, *Blume & Gen. Plant.*

6. **L. reticulata,** *Benth. in Gen. Plant.* iii. 164; branchlets robust and leaves beneath and umbels densely rusty-tomentose, leaves persistent 7–10 in. very coriaceous obovate oblong or oblanceolate-oblong obtuse or acute, nerves 10–15 pair very strong beneath with strong close cross-nervules, umbels very small clustered sessile 4–9-fld., bracts 4, fruit oblong. Polyadenia reticulata, *Nees in Wall. Pl. As. Rar.* ii. 61, and *Syst. Laurin.* 572; *Meissn. in DC. Prodr.* xv. 1. 232. Tetranthera reticulata, *Ham. in Wall. Cat.* 2551.

ASSAM; at Goalpara, *Wallich*, *Griffith* (Polyadenia grandis, *Kew Distrib.* 4278). SILHET, *De Silva.*

Branches very stout, woody, pale, furrowed. *Leaves* brown when dry, very variable in form and breadth, 2½–4 in. diam., rather shining above with slender sunk nerves, base acute; petiole ⅓–⅔ in., very stout, tomentose. *Umbels* ⅓ in. diam., bracts coriaceous concave; flowers minute, shortly pedicelled, hirsute. *Sepals* 6, unequal. *Stamens* 6–12, filaments short, villous, most or all with stipitate glands. *Fruit* ellipsoid or oblong, ½ in. long, smooth, shortly pedicelled.

7. **L. venosa,** *Benth. in Gen. Plant.* iii. 164; branchlets stout and leaves glabrous, leaves 6–10 in. long-petioled narrowly elliptic-lanceolate shining above, nerves 12–15 pair rather strong beneath with distant reticulations, umbels 15-fld. very large sessile or stoutly pedicelled clustered and at first enclosed in many broad imbricate hard rounded scales, bracts 7 coriaceous pubescent. Daphnidium venosum, *Meissn. in DC. Prodr.* xv. 1. 231. Tetranthera, *Griff. Itin. Notes* 144 n. 692, and *Notul.* iv. 355, and *Ic. Pl. Asiat.* iv. t. 353.

BHOTAN; near Oongar Bridge, alt. 6000 ft., *Griffith* (*Kew Distrib.* 4308).

A medium-sized tree, nearly leafless in winter, *Griffith*; branches stout, pale, furrowed. *Leaves* towards the ends of the branches, spreading and deflexed, rather membranous, brown above, with slender impressed nerves, paler beneath; base acute; petiole 1–1½ in., slender. *Buds* enclosing umbels ⅓–⅔ in. long, ovoid, axillary and on the branches, solitary or 2–3 together. *Umbels* nearly 1 in. diam.; bracts concave, coriaceous, pubescent; flowers villously silky, shortly pedicelled. *Sepals* 6–8, unequal. *Stamens* 9-12, filaments villous, 3 inner or more with one or two long-pedicelled cup-shaped glands; sometimes of 12 stamens 6 are eglandular, 4 2-glandular and 2 1-glandular. *Fruit* unknown.

8. **L. bifaria,** *Benth. in Gen. Plant.* iii. 164; branchlets and leaves beneath finely brown-tomentose or villous, leaves persistent 1½–6 in. pale brown coriaceous shortly petioled elliptic ovate-lanceolate acuminate, nerves 5–10 pair strong beneath with faint or strong cross-nervules, umbels small sessile 6–10-fld. solitary or clustered, bracts 6–8 imbricate, fruit small globose. Daphnidium bifarium, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 616; *Meissn. in DC. Prodr.* xv. 1. 231; *Brand. For. Fl.* 383. Tetranthera bifaria, *Wall. Cat.* 2530. Laurus Nasusua, *Don Prodr.* 64.

SUBTROPICAL HIMALAYA; Kumaon, alt. 5000 ft., *Blinkworth, Strachey & Winterbottom.* NEPAL, *Wallich.* UPPER ASSAM, Mishmi Hills, *Griffith.* KHASIA MTS., alt. 3–4000 ft., *Wallich*, &c.—DISTRIB. Yunan, China, Munnipore.

A small tree with very pale-brown branches and foliage when dry; branches rather stout. *Leaves* very variable in size and amount of hairiness, nerves and cross-nervules beneath very strong and midrib often villous, above smooth and minutely impressed-punctate; base acute or cuneate, rarely obtuse; buds scaly, youngest leaves densely clothed with fulvous long shining silky wool; petiole ¼ in., very stout. *Umbels* solitary or clustered, globose, ⅙–⅓ in. diam. before opening; bracts rounded, coriaceous, concave, brown, more or less pubescent; flowers very small, axillary in the upper bracts, shortly pedicelled, pedicel and perianth-tube velvety. *Sepals* 6, membranous, subequal. *Stamens* 9, short, filaments glabrous. *Ovary* glabrous, with a stout style and discoid stigma. *Fruit* ¼ in. diam., seated on the very small shallow cup-shaped perianth-tube.—Griffith's 2464 from Bhotan referred to *bifaria* by Meissner is not that plant; it has deciduous leaves and different branches and flowers. The specific name *bisona* quoted by Nees as that of Wall. Cat. 2550 is simply a misreading of *bifaria* which is indistinctly written.

Sect. III. **Daphnidium.** *Leaves* persistent, triple-nerved.

9. **L. caudata,** *Benth. in Gen. Plant.* iii. 164; branchlets slender and

young leaves fulvous- or rusty-hairy or tomentose, leaves persistent 3–4 in. ovate- or elliptic-lanceolate caudate-acuminate triple-nerved almost to the tip, flowers minute in very short subglobose solitary or clustered spikes bracteate and 2-bracteolate, bracteoles large the pair enclosing single flowers, fruit globose seated on the 6-cleft perianth-tube. Daphnidium caudatum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 608; *Meissn. in DC. Prodr.* xv. 1. 230; *Kurz For. Fl.* ii. 307. Tetranthera caudata, *Wall. Cat.* 2566.

KHASIA MTS., alt. 4–5000 ft., *Wallich, Griffith*, &c. MARTABAN and TENASSERIM, about 6000 ft., *Kurz.*

A small slender tree. *Leaves* brown when dry, subglaucous beneath with strong nerves and cross-nervules, thinly coriaceous, opaque above, base subacute; petiole slender, ⅓ in. *Flowers* distinctly spicate on a very short tomentose rachis, each sessile in the axil of a small bract and enclosed in two concave pubescent rather thin bracteoles; flower and bracteole about $\frac{1}{12}$ in. long. *Perianth* villous within and without at the base. *Sepals* 6, membranous, subequal. *Stamens* 9, villous, 3 inner 2-glandular (in the female 6 short filaments, each with 2 very large glands). *Ovary* glabrous with a stout style and very large discoid stigma. *Fruit* ½ in. diam.—The single flowers being bracteate recalls *Actinodaphne sikkimensis*.

10. **L. pulcherrima,** *Benth. in Gen. Plant.* iii. 164; glabrous except the silky buds, leaves persistent 4–5 in. elliptic-oblong ovate or lanceolate caudate-acuminate triple-nerved pale or glaucous beneath, umbels 5–6-fld. enclosed in 4–6 large concave imbricating deciduous bracts, fruit ellipsoid. Daphnidium pulcherrimum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 610; *Meissn. in DC. Prodr.* xv. 1. 229; *Brand. For. Fl.* 383; *Kurz For. Fl.* ii. 306; *Gamble Man. Ind. Timb.* 312.

TEMPERATE HIMALAYA; from Kumaon, alt. 5–8000 ft., to Sikkim and Bhotan, alt. 4–9000 ft. KHASIA MTS., alt. 5–6000 ft. MARTABAN; on hills ascending to 6000 ft., *Kurz.*—DISTRIB. Munnipore.

A large tree; branchlets hoary. *Leaves* membranous or thinly coriaceous, greenish when dry, minutely reticulate above with 3 slender raised nerves, beneath finely reticulate, caudate tip often 1 in. long and very slender; petiole slender, ⅓–½ in. *Clusters* quite sessile, globose; bracts pale, rather thin, concave, subsilky, outer smaller; flowers on short silky-tomentose pedicels; perianth silky. *Sepals* 6, oblong, membranous, equal or subequal. *Stamens* 9, filaments short, nearly glabrous; of female reduced to 2 glandular filaments. *Ovary* and style pubescent; stigma very large. *Fruit* ⅓ in. long; perianth wholly deciduous, or rarely fragments remain; pedicel slender, ⅓–⅔ in., not thickened at the tip.

11. **L. melastomacea,** *Benth. in Gen. Plant.* iii. 164; quite glabrous, leaves persistent 2–3 in. coriaceous obovate- or oblanceolate-oblong shortly obtusely acuminate triple-nerved not glaucous beneath, umbels 3–5-fld. sessile solitary or clustered, bracts 4, fruit ellipsoid. Daphnidium melastomaceum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 607; *Meissn. in DC. Prodr.* xv. 1. 228. Laurus cuspidata, *Don Prodr.* 64.

A shrub or small tree, with stiff erect leafy branches. *Leaves* coriaceous, greenish or brown when dry, smooth above with 3 strong nerves and indistinct nervules, the latter very slender and indistinct beneath, base narrowed into the very short (⅛–⅓ in.) petiole. *Umbels* globose in bud, usually crowded and sessile in the leaf axils, sometimes very shortly stoutly pedicelled; bracts very coriaceous, hemispheric, glabrous; flowers on villously silky pedicels, villous within. *Sepals* 6, equal or unequal. *Stamens* 9, filaments hairy, 3 inner 2-glandular. *Ovary* not seen. *Fruit* ⅓ in. long; seated on the persistent or broken up hardly changed perianth-tube; pedicel ⅓–½ in.

Sect. IV. **Sassafrimorpha,** *Benth.* *Leaves* deciduous, triple- or quintuple-nerved.

12. **L. heterophylla,** *Meissn. in DC. Prodr.* xv. 1. 246; branches robust, shoots and leaves beneath rusty-tomentose, leaves deciduous 2–4 in. entire or 3-lobed at the tip, old coriaceous orbicular ovate or oblong obtuse or subacute quintuple-nerved at the rounded or cordate base, umbels subsessile many-fld., flowers in the axils of large imbricating deciduous villous membranous bracts, fruit ellipsoid. Benzoin sericeum and Lindera triloba ?, *Herb. Ind. Or. H. f. & T.* Daphnidium bifarium in part, *Meissn. in DC. l. c.* 231 (*not of Nees*). Hamamelidea, *Griff. Itin. Notes,* 147.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 8–10,000 ft., *J. D. H.* Bhotan; at Oongar, alt. 9–10,000 ft., *Griffith.*

A shrub or small tree, with flexuous branches, flowering when leafless; buds clothed with imbricate scales. *Leaves* 2–4 in. broad, old brown when dry; above rather shining with sunk nerves and reticulations, beneath with very strong nerves; lobes if present triangular, subacute; petiole ½–¾ in., stout. *Umbels* (or contracted spikes) ½–¾ in. diam., with 3–5 very coriaceous imbricating scales at the base; each flower in the axil of a subspathulate or obovate-oblong concave bract that is villous with long hairs at the back; pedicels short, villous, as is the base of the perianth. *Sepals* linear-oblong, silkily hairy. *Stamens* 9, filaments very short, glabrous; 3 or more 2-glandular. *Fruit* immature.

13. **L. Neesiana,** *Benth. in Gen. Plant.* iii. 164; quite glabrous, leaves deciduous 3–7 in. membranous ovate acute or acuminate triple-nerved at the cuneate or cordate base, umbels solitary or clustered pedicelled 5–7-fld., bracts 4 membranous glabrous, fruit small globose. *Kurz For. Fl.* ii. 309. Aperula Neesiana, *Blume Mus. Bot.* i. 366; *Meissn. in DC. Prodr.* xv. 1. 241. Benzoin Neesianum, *Nees in Wall. Pl. As. Rar.* ii. 63, and *Syst. Laurin.* 498. Tetranthera Neesiana, *Wall. Cat.* 2538. T. prunifolia, *Wall. mss.* ? Laurus macrophylla, *Don Prodr.* 64; *Meissn. l. c.* 258.

TEMPERATE HIMALAYA; Nepal, *Wallich*; Sikkim, alt. 6–8000 ft., *J. D. H.*

A very spicy tree; shoots terete, smooth, usually quite black when dry, often very stout. *Leaves* 1½–4½ in. diam., smooth and reticulated above when dry, more or less glaucous beneath with 4–6 pairs of nerves besides the basal which do not reach the middle of the leaf, and slender distant reticulated ones. *Umbels* unopened, globose, ⅓ in. diam., on slender pedicels ⅛–½ in.; outer bracts hemispheric, inner narrower; flowers on tomentose pedicels, ¼ in. diam., green. *Sepals* orbicular, nearly glabrous, very membranous. *Stamens* 9, filaments short, glabrous, inner 2-glandular. *Fruit* ⅙ in. diam., seated on the unaltered perianth with fragments of the sepals.—This has much the habit of *L. oxyphylla* and *Litsæa polyantha.*

Var. ? *Griffithii*; bark of branchlets quite white, umbels racemose on a short slender peduncle.—Mishmi Mts., *Griffith.*

SPECIES OF UNDETERMINED SECTION.

14. **L. bootanica,** *Meissn. in DC. Prodr.* xv. 1. 245; branches stout pale grey deeply grooved (by contraction of the bark), annual shoots herbaceous black when dry, leaves (young) scattered deciduous membranous 3–5 in. penninerved lanceolate acuminate densely softly tomentose beneath narrowed into the ½ in. slender petiole, buds ovoid large with very broad densely silky scales, umbels of fem. fl. on a stout glabrous ½ in. peduncle, flowers 8–10 on stout villously silky or tomentose pedicels, perianth-tube campanulate villous, lobes 6 or more unequal oblong erect glabrous, staminodes on the top of the tube narrow spathulate exserted slightly hairy, some with pedicelled glands, ovary ovoid sunk in the perianth-tube, stigma sessile ?.

BHOTAN, *Griffith* (919 a) (*Kew Distrib.* 4325).—A few very imperfect male flowers are scattered among the females. They are in a broken condition, have a very short perianth-tube, and short filaments, and 2-celled oblong anthers.

15. **L. Griffithii,** *Meissn. in DC. Prodr.* xv. 1. 245; branches slender woody glabrous, leaves much too young for description ¼–½ in. long deciduous penninerved lanceolate acute silky, female fl. white odorous in very small axillary subsessile nodding clusters very shortly pedicelled and pedicels silky tomentose, perianth ⅛ in. diam., tube very short obconic, sepals 6 broad glabrous, staminodes very short with large glands glabrous, ovary glabrous, style short, stigma discoid.

BHOTAN, above Tongsa, alt. 8500 ft., *Griffith* (*Kew Distrib.* 4334).—Griffith describes the flowers and bracts as white.

16. **L.? sikkimensis,** *Meissn. in DC. Prodr.* xv. 1. 245; a bush 15 ft. high, branchlets woody rugose, shoots inflorescence and young leaves beneath clothed with long golden red villous hairs, leaves (young) 2–2½ in. scattered deciduous penninerved membranous, obovate-oblong narrowed into a short petiole, tip rounded, nerves 6–8 pair very slender, umbels subsessile few-fld., fem. fl. very shortly pedicelled, perianth-tube short, sepals 6 orbicular, staminodes very short almost reduced to glands, ovary ovoid glabrous, style short, stigma small.

SIKKIM HIMALAYA; Lachen, alt. 11–12,000 ft., *J. D. H.*—This is quite unlike any other species of *Lindera*. The adult leaves probably differ a good deal from the young here described.

17. **Daphnidium argenteum,** *Kurz For. Fl.* ii. 307; a deciduous tree, shoots silvery silky hairy, leaves 3½–6½ in. lanceolate to broad-lanceolate acuminate at both ends firmly membranous glabrous above appressed silvery-pubescent beneath penninerved laxly reticulate on both surfaces, petiole glabrescent or silvery-pubescent ¼–⅓ in., flowers on very short tomentose pedicels forming a short densely tomentose raceme involucred by pubescent concave bracts at the base, perianth appressed pubescent filaments almost glabrous, anthers 2-celled. (*Description from Kurz.*)

MARTABAN and Eastern slopes of the PEGU Yomah, *Kurz.*

18. **Daphnidium lancifolium,** *Thwaites Enum.* 257; *Meissn. in DC. Prodr.* xv. 1. 229; "a tree young parts and inflorescence fulvous silky, leaves (5–7) more or less crowded at the ends of the branches 2–3½ by ½–¾ in. lanceolate acutely acuminate smooth or minutely rugulose above white and pruinose beneath triple-nerved, base acute, lateral nerves hardly reaching the middle of the leaf, petiole ¼–½ in., buds (umbels) 3–4-fld. with 4 scales sessile on the branches below the leaves, flowers subsessile $\frac{1}{10}$ in. long." *Thwaites.*

CEYLON; Central Province, Hapootelle district, *Thwaites.*

Of this its author says it is apparently near *D. melastomaceum*, but the few leaves I have seen do not bear this out; he says that he has seen only a single specimen mixed with *Actinodaphne stenophylla*, which it greatly resembles. The anthers are not described, and I suspect that if 4-celled this is a *Litsæa*, and that the 4 scales are the involucral bracts. On the specimen sent to Kew Thwaites says that he has seen neither flower nor fruit.

14. CASSYTHA, *Linn.*

Filiform twining parasites, adhering to their hosts by suckers. *Leaves* minute scales, or 0. *Flowers* minute, 2-sexual or dimorphic? spiked capitate or racemose, 3-bracteolate. *Perianth-tube* short and globose or (often in the same species) as long as the limb and turbinate; segments 6, 3 outer smaller. Perfect *stamens* 9, filaments of 1st series eglandular with 2-celled introrse anthers, of the 2nd similar or stamens reduced to staminodes, of the 3rd 2-glandular with extrorse 2-celled anthers. *Fruit* enclosed in the succulent perianth-tube, crowned by its limb. *Cotyledons* at length confluent.—Species about 15, Australian, with a few S. African and one widely distributed.

1. **C. filiformis,** *Linn. Sp. Pl.* 35; quite glabrous, or young parts puberulous, stems slender, flowers sessile in lax or dense lateral spikes, perianth twice the length of the rounded ciliate bracteoles, outer sepals rounded ciliate, inner oblong, fruit globose smooth (not ribbed). *Nees Syst. Laurin.* 642; *Meissn. in DC. Prodr.* xv. 1. 255; *Wight Ic.* t. 1847; *Wall. Cat.* 2608 and 7534; *Roxb. Fl. Ind.* ii. 314; *Dalz. & Gibs. Bomb. Fl.* 223; *Griff. Notul.* iv. 353; *Hook. Fl. Exot.* t. 167; *Benth. Fl. Austral.* v. 311. C. americana and C. guineensis, *Meissn. in DC. l. c.* 311.—*Rheede Hort. Mal.* vii. t. 44.

From BANDA to BENGAL, SILHET? and CHITTAGONG, and southward to TRAVANCORE and CEYLON. PENANG, *Wallich.* MALACCA, *Griffith.*—DISTRIB. Arabia, Mascarene Island, Tropical E. Asia and islands, Australia, Polynesia, Tropical Africa and America.

Forming a web of leafless cords over bushes. *Spikes* ½–2 in.; flowers $\frac{1}{12}$ in., white, rather distant; bracts rounded, ciliate. *Perianth-segments,* outer small, rounded, ciliate; inner much longer, ovate. *Fruit* glabrous, the size of a pea, crowned by the perianth-lobes.

2. **C. capillaris,** *Meissn. in DC. Prodr.* xv. 1. 252; quite glabrous, stems capillary, flowers few in very small peduncled heads, bracts minute acute, sepals ovate obtuse inner rather the longest.

CEYLON, *Thwaites.*—DISTRIB. Borneo.

A much more slender plant than *C. filiformis,* forming hair-like masses of considerable length.

15. HERNANDIA, *Linn.*

Evergreen trees. *Leaves* alternate, ovate or peltate, 3–7-nerved. *Flowers* monoecious, 3-nately involucrate at the ends of the branches of a lax panicle, pedicelled, centre flower ♀ with a cupular involucel at its base, lateral ♂; bracts of involucre 4–5, subvalvate in bud. *Perianth-segments* in 2 valvate series, 3–6 in ♂ fl., 4–8 in ♀ fl. *Stamens* as many as and opposite to the outer perianth-segments, filaments 1–2- or e-glandular; anthers 2-celled, extrorse; staminodes 4–5 in fl. ♀. *Ovary* inferior; style short, stigma dilated toothed or lobed. *Fruit* enclosed in the enlarged involucel. *Seed* globose or ovoid, testa thick hard ribbed; embryo thick, lobed and ruminate. —Species 8, tropical.

H. peltata, *Meissn. in DC. Prodr.* xv. 1. 263; leaves rounded-ovate obtuse or acute peltate, flowers in hoary long-peduncled corymbs, filaments 2-glandular, fruit ovoid 8-ribbed. *Kurz For. Fl.* ii. 309; *Beddome Fl Sylvat.* t. 300; *Benth. Fl. Austral.* v. 314; *Seem. Fl. Vit.* 205, t. 32. H Sonora, *Linn. in part*; *Wight Ic.* t. 1855; *Thwaites Enum.* 258; *Wall. Cat* 7811.

SINGAPORE, *Wallich.* ANDAMAN ISLANDS, *Herb. Calcutt.* CEYLON; on the sea shore.—DISTRIB. Malay Archipelago, N. Australia, Pacific Islands, E. Africa, Madagascar.

A tree; branchlets stout, smooth, wood soft. *Leaves* 6–12 in., rather coriaceous 5–9-nerved; petiole as long, stout. *Corymbs* 4–10 in. broad; flowers clustered middle one of the three female with sometimes a few males below it. *Male fl.* ⅓ in diam.; segments 6, hoary, 2-seriate; filaments short. *Female fl.* smaller; involuce cupular, $\frac{1}{10}$ in. long, in fruit greatly enlarged and enclosing the drupe; perianth-tube adnate to the ovary, segments 8, narrow; glands 4, subglobose; style villous, thickened upwards, deciduous with the perianth-lobes, stigma dilated irregularly lobed. *Fruit* enclosed in the involucel, except at the apex, together 1¼ in. diam. *Seed* hard.—I suspect that this may prove to be only a variety of the American *H. Sonora*, Linn.

Whilst this sheet was passing through the press, Mr. C. Curtis has sent from Penang flowering specimens of a plant with the habit and foliage of an *Endiandra*, but having 6 very short broad thick sessile anthers, opposite to each of which is a broad but rather longer villous staminode, which is closely appressed to the ovoid glabrous ovary. The broad thick square anther has two small extrorse circular pores closed by caducous valves.—It is no doubt a new and very singular genus, allied to *Endiandra*, which may bear the name of *Hexapora Curtisii*, in allusion to the pore-like cells of the three anthers.

ORDER CXXIX. PROTEACEÆ.

Trees or shrubs, rarely herbs. *Leaves* alternate or scattered, rarely sub-opposite or whorled, mostly hard, entire toothed or pinnatisect, exstipulate. *Inflorescence* various. *Flowers* 2-sexual. *Perianth* inferior, often irregular, segments 4 at first valvately cohering in a cylindric tube gibbous at the base, with free recurved tips. *Stamens* 4, shorter than and inserted on the segments; anthers erect, adnate to the filaments, 2-celled, introrse. *Hypogynous glands* or scales 4, free or connate, alternating with the stamens, or 0. *Ovary* 1-celled, often oblique; style terminal, tip thickened, stigma terminal or lateral. *Ovules* solitary or geminate or many 2-seriate. *Fruit* various. *Seed* exalbuminous; cotyledons compressed or fleshy, often unequal; radicle short inferior or lateral.—Genera 50, species about 950, chiefly Australian and S. African, none N. American, European or N. Asiatic.

1. **HELICIA**, *Lour.*

Trees or shrubs. *Leaves* alternate, entire or toothed. *Flowers* in terminal and axillary racemes, 2-sexual. *Perianth* regular, tube slender; limb narrow, straight, segments at length revolute. *Anthers* oblong, connective produced. *Hypog. scales* free, or confluent in a cup-shaped or annular disk. *Ovary* sessile; style slender, stigma terminal; ovules 2, basal or lateral, ascending. *Nut* hard, globose. *Seeds* subglobose, or 2 hemispheric.—Species 25, Tropical Asia and Australia.

* Racemes glabrous.

† *Leaves narrowed at the base into a distinct petiole.*

1. **H. erratica**, *Hook. f.*; quite glabrous, leaves 4–7 in. cuneate-obovate or -oblong to oblanceolate or elliptic-lanceolate acute or obtuse entire or coarsely serrate narrowed into a short petiole, racemes glabrous, hypog. scales more or less connate, ovary glabrous, fruit 1–1½ in. diam. obliquely globose or depressed umbonate. H. cochinchinensis, *Kurz For. Fl.* ii. 311, and *Meissn. in DC. Prodr.* xiv. 442 (*the Assam plant only*). H. robusta, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 2–6000 ft., *J. D. H.* KHASIA MTS., common. MARTABAN, alt. 5–7000 ft., *Kurz, Parish.*

A small tree. *Leaves* 2–4 in. broad, coriaceous, shining above, nerves 7–12 pair; petiole ⅓–¾ in. long. *Racemes* 6–9 in. *Perianth* pale yellowish, slender, 1½ in. long when unexpanded. *Hypog. glands* obtuse. *Fruit* usually very oblique, base abruptly narrowed. *Cotyledons* turning a bright red when cut.—This is no doubt the Assam *H. cochinchinensis* of Meissner, and Kurz's plant of that name; it differs from Loureiro's

H. cochinchinensis (which this author describes as having a small ovate drupe with a longitudinal furrow) in the very large broad fruit, and in being a mountain plant.—I suspect that the "Pundua Mt." (Khasia Mts.) specimens of *H. attenuata* of *Wall. Cat.* 1040/2 are this, but without fruit it is impossible to say.

2. **H. attenuata,** *Blume in Ann. Sc. Nat. Ser.* 2. i. 216; quite glabrous, leaves 3–6 in. elliptic-oblong acute at both ends narrowed into a short petiole entire or obscurely serrate, racemes quite glabrous, hypog. scales connate, ovary glabrous, fruit 2 in. long ovoid narrowed at both ends obtusely 6-angled. *Bennet Pl. Rar. Jav.* 83; *Meissn. in DC. Prodr.* xiv. 439. Rhopala attenuata, *Jack Mal. Misc.* i. No. 2. 10; *Wall. Cat.* 1040. R. racemosa, *Roxb. mss.*

PENANG, *Jack.* ? KHASIA MTS., *De Silva.*

This is not distinguishable from *H. erratica* except by the fruit.

3. **H. nilagirica,** *Beddome in Madr. Journ. Lit. and Sc.* 1864, *with figure*, and *For. Man.* 1878; quite glabrous, leaves broadly-ovate elliptic or lanceolate acute base narrowed into the petiole coarsely acutely toothed submembranous, racemes shorter than the leaves, fruit spherical ⅓ in. diam.

NILGHIRI HILLS; on Western slopes, alt. 3–4000 ft., *Beddome.*

This again closely resembles *H. erratica* and *attenuata*, but differs in the fruit, which from Beddome's observations is spherical and very small.—It is remarkable that no specimens of this exist in the collections of Wight or any other of the numerous collectors in the Nilghiris but Beddome's, and I have seen none.

4. **H. ceylanica,** *Gardn. in Calc. Journ. Nat. Hist.* vii. 453; quite glabrous, leaves 3–4 in. obovate-oblong obtuse or tip rounded quite entire narrowed into a petiole, racemes and ovaries quite glabrous, hypog. scales distinct tips subacute, fruit ovoid narrowed at both ends about 1 in. long. *Meissn. in DC. Prodr.* xiv. 438 (zeylanica); *Thwaites Enum.* 250; *Beddome For. Man.* 178.

CEYLON; in the Central Province, alt. 2–4000 ft., *Gardner, Thwaites.*

A middling-sized tree. *Leaves* 1½–2 in. broad; petiole ½ in. *Panicle* with a purple rachis. *Perianth* pale yellow, unopened ⅓ in. long. *Fruit* (not seen by me) the size of a hazel-nut, black-purple.—This again is very near *H. attenuata.*

5. **H. petiolaris,** *Bennet Plant. Rar. Jav.* 84; quite glabrous, leaves 5–7 in. broadly oblong or broadly cuneately obovate obtuse or subacute quite entire, base suddenly narrowed and decurrent on the long petiole. *Meissn. in DC. Prodr.* xiv. 438. Rhopala moluccana, *Jack Mal. Misc.* i. No. 2. 10 (*not of Brown*); *Wall. Cat.* 1041.

SINGAPORE, *Wallich.* (Cult. in Penang, *Jack.*)

Leaves 5–6 by 3–3½ in., firmly coriaceous; nerves spreading; petiole 1½ in. *Racemes* longer than the leaves. *Flowers* 1 in. long.—Very distinct from any of the preceding species.

6. **H. terminalis,** *Kurz For. Fl.* ii. 312; glabrous or nearly so, leaves obversely oblong retuse with a mucro, base acuminate and tapering into a long slender petiole entire or somewhat waved, raceme at the end of the branchlets slender glabrous much longer than the leaves.

AVA; on the Kakhyen Hills, *Kurz.*

I have seen no specimens of this, which from Kurz's description must be near *H. petiolaris*, and differs from its congener in the terminal raceme; the leaves are 3–5 in. long, the petiole ¼–½ in., and the flowers about ½ in.

†† *Leaves sessil or subsessile base obtuse or retuse.*

7. **H. robusta,** *Wall. Cat.* 2702; quite glabrous, leaves obovate-oblong narrowed towards the rounded or obtuse base, obtuse or obtusely acuminate coarsely serrate, hypog. scales more or less connate, fruit obliquely globose apiculate abruptly narrowed into a short stipes. *Bennet Pl. Rar. Jav.* 83; *Meissn. in DC. Prodr.* xiv. 440; *Kurz For. Fl.* ii. 311. H. macrophylla, *Wall. Cat.* 3661. H. castaneæfolia, *Meissn. in DC. Prodr.* xiv. 441. H. javanica, *Blume in Ann. Sc. Nat. Ser.* 2. i. 217; *Bennet l. c.* 83, t. 18; *Meissn. l. c.* 440. Helittophyllum javanicum, *Blume Bijd.* 652. Rhopala robusta, *Roxb. Fl. Ind.* i. 363, and *Ed. Carey & Wall.* i. 366; *Wight Ic.* t. 191. R. glabrata, *Wall. Cat.* 1039.

ASSAM and KHASIA MTS., *Roxburgh, Wallich, Griffith.* MARTABAN and TENASSERIM, on the hills, alt. 2–4000 ft. MALACCA, *Griffith, Cumming, Maingay.*—DISTRIB. Java, Sumatra.

A small tree, branches robust. *Leaves* 8–12 in. by 3–5 in., very coriaceous, nerves strong beneath, serrated to the base or not; petiole 0 or very short and stout. *Racemes* shorter or longer than the leaves, sometimes 1 foot long. *Flowers* ¾–1 in. long in bud. *Fruit* 1 in. diam., obscurely ribbed when dry.—Meissner's *H. castaneæfolia* was founded on specimens wrongly ticketed as from the Philippines. Bennet distinguished *H. javanica* by the hypogynous scales being free, but as Kurz describes those of *robusta* as all connate or "one or a few free," this character will not hold, and I can find no other.

8. **H. travancorica;** *Beddome mss.*; quite glabrous, leaves subsessile obovate-oblong obtusely acuminate distantly serrate base obtuse, racemes shorter than the leaves, fruit globose apiculate base rounded. H. robusta, *Beddome For. Fl.* t. 301 (*excl. syn.*).

SOUTH DECCAN; hills of Travancore and Tinnevelly, at about 4000 ft. elevation, *Beddome.*

This resembles *H. robusta* in the form of the leaf, which is however smaller and more coriaceous; it differs in the short racemes 3 in. long, and notably in the quite globose perfectly smooth apiculate fruit, not at all stipitate but rounded at the base, and only ¾ in. diam.

** *Rachis of the raceme pubescent, tomentose or villous.*

9. **H. excelsa,** *Blume in Ann. Sc. Nat. Ser.* 2. i. 219; shoots rusty-tomentose, leaves oblanceolate or cuneately obovate obtusely acuminate quite entire or coarsely serrate narrowed into the rather slender petiole glabrous, racemes and flowers rusty-villous, ovary villous, fruit small, smooth. *Bennet Plant. Jav. Rar.* 84; *Meissn. in DC. Prodr.* xiv. 441; *Kurz For. Fl.* ii. 312. H. salicifolia, *Presl Epim. Bot.* 247; *Meissn. l. c.* 439; *Kurz l. c.* Rhopala excelsa, *Roxb. Fl. Ind.* i. 363, and *Ed. Carey & Wall.* i. 365; *Wall. Cat.* 1038; *Wight Ic.* t. 190.

SILHET, *Roxburgh.* KHASIA MTS., alt. 3–5000 ft., *J. D. H. & T. T.* CHITTAGONG and TENASSERIM, *Helfer, &c.*—DISTRIB. Cambogia.

A large tree. *Leaves* 4–6 by 1½–2½ in., coriaceous, yellow green when dry; petiole ⅓–½ in. *Racemes* axillary and terminal, about equalling the leaves, more or less villous. *Flowers* 2–5-nate, yellowish green, ¼–⅓ in. long in bud. *Fruit* (in Malaccan specimens) obliquely ovoid, obtuse, smooth, ⅓ in. long when dry. Presl's *H. salicifolia* from Helfer (*Kew Distrib.* 4366) seems in no way different, except in the connate scales. *H. loranthoides,* Presl, from the Philippines, is possibly the same species. Malaccan specimens have nearly glabrescent flowers.

10. **H. pyrrhobotrya,** *Kurz in Journ. As. Soc. Beng.* 1873, ii. 303, and *For. Fl.* ii. 312; shoots rusty-villous, leaves oblanceolate narrowed into the very stout petiole acuminate coarsely serrate, glabrous or with the midrib beneath rusty-pubescent, racemes very long stout and flowers rusty-villous, ovary glabrous.

MARTABAN HILLS, alt. 4000 ft., *Brandis, Kurz.*

Branches very robust. *Leaves* 12–14 by 3–3½ in.; petiole ¾ in. *Racemes* as long as the leaves, rachis very stout, flowers 1–1¼ in. long (*Kurz*) solitary or 2–3-nate; pedicels stout, villous; style 1½ in. *Fruit* unknown.—A very distinct species. Kurz describes the leaves as "narrowed towards the obtuse base;" but they are quite acute in our (solitary) specimen from Kurz.

ORDER CXXX. **THYMELÆACEÆ.**

Shrubs or trees, rarely herbs, with tough fibrous inner bark. *Leaves* alternate or opposite, simple, quite entire. *Flowers* usually 2-sexual, axillary or terminal, in heads umbels clusters spikes or racemes. *Perianth* regular, tubular or campanulate, 4–5-lobed, imbricate in bud, often with 1–2 scales at the base. *Stamens* 2, or as many or twice as many as the lobes; anthers 2-celled. *Disk* annular, cupular or of scales. *Ovary* superior, 1- rarely 2-celled (4–5-celled in *Gonystylus*); style short or long, terminal or eccentric, stigma capitate; ovules solitary or one in each cell, pendulous from near the top of the cell, anatropous. *Fruit* indehiscent (capsular in *Aquilarineæ*). *Seed* pendulous or lateral, albumen fleshy or 0; embryo straight, radicle superior.—Genera nearly 40, species 360, temperate and tropical.

TRIBE I. **Euthymeleæ.** *Ovary* 1-celled, 1-ovuled. *Fruit* indehiscent.

* Perianth without scales. Stamens as many and opposite the perianth-lobes or twice as many. Flowers 4-nerved.

† *Perianth not circumsciss in fruit.*

Perianth-tube cylindric. Style 0. Disk 0	1. DAPHNE.
Perianth urceolate. Style short. Disk 0 or minute . . .	2. THYMELÆA.
Perianth-tube cylindric. Style long, stigma linear . . .	3. EDGEWORTHIA.
Perianth-tube cylindric. Style short, stigma large . . .	4. WIKSTRŒMIA.

†† *Perianth circumsciss after flowering.*

Shrubs, leaves flat	5. STELLERA.
Annuals, leaves linear	6. DIARTHRON.

** Perianth with scales above the stamens. Flowers 5-nerved.

Fruiting perianth circumsciss; pericarp thin	7. LASIOSIPHON.
Fruiting perianth not circumsciss; pericarp thick	8. LINOSTOMA.

TRIBE II. **Phalerieæ.** *Ovary* 2-celled; cells 1-ovuled. *Fruit* indehiscent.

Flowers sessile. Stamens exserted	9. PHALERIA.

TRIBE III. **Aquilarieæ.** *Ovary* 2-celled; cells 1-ovuled. *Fruit* a loculicidal capsule.

Perianth-tube cylindric. Stamens 5	10. GYRINOPS.
Perianth campanulate. Stamens 10	11. AQUILARIA.

Anomalous genus. Ovary 4–5-celled.	GONYSTYLUS.

1. DAPHNE, *Linn.*

Shrubs or small trees. *Leaves* alternate. *Flowers* in terminal or lateral sessile or peduncled heads or clusters. *Perianth* tubular, lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate, subsessile; anthers dorsifixed. *Ovary* 1-celled; style very short or 0. *Fruit* coriaceous or fleshy. *Testa* crustaceous.—Species about 80, Europe, N. Africa, Temp. Asia.

1. **D. oleoides**, *Schreb.*; *Boiss. Fl. Orient.* iv. 1047; leaves 1–2½ in. obovate oblanceolate or linear-lanceolate obtuse acute or mucronate sparsely hairy or glabrate, flowers in terminal sessile or subsessile clusters ebracteate, perianth silky. *Meissn. in DC. Prodr.* xiv. 533; *Jaub. & Sp. Ill. Pl. Or.* t. 305. D. mucronata, *Royle Ill.* 322, t. 81, f. 2; *DC. l. c.* 536; *Brand. For. Fl.* 384; *Gamble Man. Ind. Timb.* 315. D. coriacea, *Royle l. c.* 321. D. buxifolia, *Vahl Symb.* i. 29; *Sibth. Fl. Græc.* t. 357; *Jaub. & Sp. l. c.* 306. D. acuminata, *Boiss. & Hoh. Diagn. Ser.* 1. xii. 103; *Boiss. Fl. Orient.* iv. 1048. ? D. cashemireana, *Meissn. l. c.* 535.

WESTERN HIMALAYA; from Garwhal westwards to Murree and the Suliman Range, alt. 3–9000 ft.—DISTRIB. Affghanistan and westwards to Italy.

A small much-branched shrub; branches green brown or purple, pubescent or glabrate. *Leaves* very variable, sessile, coriaceous. *Flowers* white or tinged with pink, about ⅓ in. long; lobes ovate or lanceolate, very variable in length. *Ovary* pubescent. *Fruit* dry or rather fleshy, ¼–⅓ in. long, ellipsoid, orange or scarlet.

2. **D. cannabina**, *Wall. in Asiat. Research.* xiii. 315, t. 7, 8 and *Cat.* 1045 (not of Loureiro); leaves 2–4 in. oblanceolate or linear-lanceolate or elliptic obtuse or obtusely acuminate glabrous, flowers in terminal and lateral sessile bracteate heads, perianth-tube cylindric pubescent. *Griff. Notul.* iv. 370. D. papyracea, *Wall. ex Steud. Nomencl.* 483; *Meissn. in Denkschr. Regensb. Bot. Gesell.* iii. 282; and in *DC. Prodr.* xiv. 537; *Dcne. in Jacq. Voy. Bot.* 143, t. 148; *Brand. For. Fl.* 386; *Gamble Man. Ind. Timb.* 315; *Madden in Journ. As. Soc. Beng.* xviii. 610. D. odora & Bholua, *Don Prodr.* 68. D. papyrifera, *Ham. mss.*

TEMPERATE HIMALAYA; from Chamba to Bhotan, alt. 5–7000 ft. in the west, and 6–10,000 in the east. KHASIA MTS., alt. 3–6000 ft.

A shrub, 7–8 ft.; branches glabrous, except the youngest, leafy at the tips. *Leaves* thinly coriaceous, nerves faint; petiole very short. *Flowers* white purple or yellowish, very sweet; bracts oblong or lanceolate. *Perianth* ½ in., tube rather slender; lobes broad or narrow, ovate, acute. *Fruit* ovoid, succulent, red or orange.—Possibly two species are included here. Small alpine states 6–8 in. high from Sikkim have broadly elliptic-ovate hard reticulated leaves ½–1 in. long, and dark brown when dry; the stems are buried in the ground with the few leaves and small greenish-white flowers exserted.—Finding no authority for Steudel having attributed the name of *D. papyracea* to Wallich, I have taken for it that of *D. cannabina* which Wallich did give it, though under the erroneous impression that it was Loureiro's plant of that name (which is *Wikstrœmia indica*).

3. **D. involucrata**, *Wall. in Asiat. Research.* xiii. t. 6, and *Cat.* 1050; leaves 3–6 in. oblong-lanceolate acuminate glabrous, flowers in long-peduncled axillary involucrate heads, perianth ⅓–½ in. silkily villous. D. Wallichii, *Meissn. in DC. Prodr.* xiv. 2. 540. Eriosolena Wallichii, *Meissn. Gen.* ii. 242. Scopolia involucrata, *C. A. Mey. in Bull. Imp. Acad. Sc. St. Petersb.* 1843, 357. D. longifolia, *Meissn. in Regensb. Denkschr.* iii. 285; *DC. l. c.*—Daphne sp. *Griff. Notul.* iv. 370, and *Ic. Pl. Asiat.* t. 538.

SIKKIM HIMALAYA, alt. 6000 ft., *J. D. H. & T. T.* KHASIA MTS., alt. 4–6000 ft., common. Patkoye Mts. in UPPER ASSAM, *Griffith*. TENASSERIM MTS., alt. 4–5000 ft., *Parish*, &c.

A tall lax shrub, often 20 ft. high; branches glabrous, except the tips. *Leaves* narrowed at both ends, pale beneath, thin; nerves very many, slender, arching; petiole $\frac{1}{8}$ in. *Heads* few- or many-fld.; peduncles solitary or fascicled, filiform, $\frac{1}{2}$–4 in. long, glabrous or villous, bracteolate at the base; involucral bracts 2, boat-shaped, obtuse, silky; flowers white, scented, limb flesh-coloured. *Perianth* villously silky; lobes ovate, acuminate, much shorter than the tube. *Fruit* ovoid, $\frac{1}{3}$ in. long, black.

4. **D. pendula,** *Sm. Ic. Ined.* ii. 34*, t. 34; leaves 3–5 in. oblong-lanceolate acuminate glabrous, flowers in long-peduncled axillary involucrate heads, perianth $\frac{1}{4}$–$\frac{1}{3}$ in. silkily villous. *Meissn. in DC. Prodr.* xiv. 2. 540; *Miq. Fl. Ind. Bat.* i. pt. 1, 877. D. montana, *Meissn. in Regensb. Denkschr.* iii. 284. Erisolena montana, *Blume Bijd.* 651; *Meissn. in DC. l. c.*

BURMA; on the hills between Nattoung and Moulmein, *Parish*.—DISTRIB. Java, Sumatra.

Very similar to *D. involucrata*, but smaller in all its parts, and with the flower smaller in proportion to the leaves. It may be only a variety.

2. THYMELÆA, *Endl.*

Herbs shrubs or undershrubs, rarely annual. *Leaves* scattered, usually small, narrow. *Flowers* small, 2-sexual or polygamous, axillary, sessile; bracts small. *Perianth* urceolate or males rarely tubular; lobes 4, spreading; scales 0. *Disk* minute annulate. *Stamens* 8, 2-seriate; anthers subsessile. *Ovary* subsessile, 1-celled, style very short, stigma capitate. *Fruit* dry, included in the perianth or wholly naked, pericarp membranous. *Testa* crustaceous, albumen scanty or 0.—Species 20, Mediterranean region to E. Asia.

T. arvensis, *Lamk. Fl. Franc.* iii. 218, and *Ill.* t. 293; annual, very slender, glabrous or sparsely pubescent, stem strict erect leafy, leaves sessile linear-lanceolate, flowers axillary sessile minute. *Meissn. in DC. Prodr.* xiv. 1. 551. Lygia Passerina, *Fasan. in Act. Acad. Neap.* 1787, 235; *Boiss. Fl. Orient.* iv. 1052. Passerina annua, *Wikstr. in Act. Holm.* 1818, 320; *Nees Gen. Fl. Germ.* iii. t. 47. Stellera Passerina, *Linn. Sp. Pl.* 559; *Jacq. Ic. Rar.* i. t. 68; *Reichb. Ic. Fl. Germ.* xi. 12, t. 550; *Gærtn. Fruct.* i. 186, t. 39, f. 2. P. diarthronoides, *Griff. Notul.* iv. 365, and *Ic. Pl. Asiat.* t. 534.

UPPER PANJAB; plains below Jummoo, *Thomson*. KASHMIR, Ramoo, alt. 6000 ft. *Clarke*.—DISTRIB. Affghanistan and westward to France and N. Africa.

Stem 8–18 in., sparingly branched, branches erect. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in., suberect, acuminate. *Flowers* $\frac{1}{10}$ in., hermaphrodite, in all the axils, and forming long leafy very slender spikes. *Perianth* appressed-pubescent; lobes ovate, obtuse, erect, very short. *Fruit* $\frac{1}{10}$–$\frac{1}{8}$ in. long, ovoid, narrowed upwards.

3. EDGEWORTHIA, *Meissn.*

Shrubs. *Leaves* scattered. *Flowers* capitate, 2-sexual, in sessile or peduncled axillary heads; bracts involucriform or 0. *Perianth-tube* cylindric; lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate; anthers subsessile. *Disk* annular, lobulate. *Ovary* sessile, villous, 1-celled; stigma elongate, cylindric. *Fruit* included in the base of the perianth, pericarp coriaceous. *Testa* crustaceous.

E. Gardneri, *Meissn. in Denkschr. Regensb. Bot. Gesellsch.* iii. 280, t. 6, and in *DC. Prodr.* xiv. 2. 543. E. chrysantha, *Lindl. in Journ. Hort. Soc.* i. 148, and *Bot. Reg.* 1847, t. 48; *Meissn. in DC. l. c.*; *Fl. des Serres*, t. 289. E. papyrifera, *Zucc. in Abhandl. Math. Phys. Kl. Bair. Acad.* iv. 3. 199; Daphne Gardneri, *Wall. in As. Research.* xiii. 388, t. 9, and *Cat.* 1044; *Don Prodr.* 69. D. papyrifera, *Sieb. in Act. Batav.* xii. 24.

CENTRAL and EASTERN HIMALAYA; Nepal, *Wallich.* Sikkim, alt. 5–7000 ft., *J. D. H.*, &c. BHOTAN, *Griffith.*—DISTRIB. China, Japan.

A large much-branched bush, with stout branches. *Leaves* 3–5 in., elliptic-lanceolate, acuminate, glabrous above, pubescent or silky beneath; petiole ¼–⅓ in. *Peduncle* 0–1 in., stout, decurved, silky; heads 1–2 in. diam., naked at the base or surrounded with short linear silky bracts. *Flowers* densely crowded, golden yellow, sweet-scented. *Perianth* ½–¾ in. long, densely silky; lobes short, broadly ovate or rounded.—I find no character whereby to distinguish the Chinese and Japanese plant from the Himalayan.

4. WIKSTRŒMIA, *Endl.*

Trees or shrubs. *Leaves* opposite, rarely alternate. *Flowers* 2-sexual, in terminal racemes or spikes, ebracteate. *Perianth-tube* elongate; lobes 4, spreading. *Stamens* 8, 2-seriate, filaments short. *Disk* of 1–4 scales. *Ovary* villous, 1-celled; style short, stigma large globose. *Fruit* fleshy and naked, or more dry and included in the base of the perianth. *Testa* crustaceous, albumen sparing or 0.—Species about 20, Tropical and E. Asia, Australia, Pacific.

1. **W. indica,** *C. A. Mey.*, var. viridiflora; glabrous, leaves subopposite ½–1 in. oblong or obovate-oblong tip rounded base cuneate, flowers in terminal subsessile fascicles, perianth nearly glabrous, lobes short obtuse. W. viridiflora, *Meissn. in Denkschr. Regensb. Bot. Gesellsch.* iii. 286, and in *DC. Prodr.* xiv. 2. 546; *Benth. Fl. Hongk.* 297. Daphne viridiflora, *Wall. Cat.* 1049. Diplomorpha ? viridiflora, *C. A. Mey. in Bull. Imp. Acad. Sc. St. Petersb.* 1843, 358.

CHITTAGONG, *J. D. H. & T. T.* TENASSERIM; at Mergui, *Griffith.* SINGAPORE, *Lobb.*—DISTRIB. China, Mauritius (naturalized), Philippines.

A shrub. *Leaves* 1–1½ in., thinly coriaceous, brown when dry, nerves numerous, very slender. *Flowers* few in a cluster, ebracteate. *Perianth* ⅓ in. long, glabrous, greenish yellow. *Disk-scales* usually united in pairs. *Fruit* ¼ in. long, ovoid, scarlet.—This appears to be nothing but a short-leaved form of the common N. and S. Pacific Island and Malayan *W. indica*, which finds its western limit in the Bay of Bengal, and with which it is united by Bentham in the Australian Flora (vi. 37).

2. **W. canescens,** *Meissn. in Denkschr. Regensb. Bot. Gesellsch.* iii. 288, and in *DC. Prodr.* xiv. 2. 547; branchlets and inflorescence silkily pubescent, leaves alternate and opposite oblong-lanceolate acute usually glabrous above and pubescent beneath, peduncles axillary and terminal few-fld., perianth-lobes short obtuse. *Dcne. in Jacquem. Voy. Bot.* 145. W. salicifolia, *Dcne. in Ann. Sc. Nat. Ser.* 2. xx. 50, and in *Jacquem. Voy. Bot.* 144*, t. 149; *Meissn. in DC. l. c.* 546. W. chamædaphne and W. inamœna, *Meissn. in DC. l. c.* W. virgata, *Meissn. l. c.* 289, and in *DC. l. c.*; *Beddome For. Man.* 178, t. 25, f. 4. Daphne canescens & virgata, *Wall. Cat.* 1046, 1047. D. sericea, *Don Prodr.* 69. D. inamœna, *Gardn. in Calc. Journ. Nat. Hist.* vii. 454. D. oppositifolia, *Ham. mss.* Diplomorpha canescens & virgata, *C. A. Mey. in Bull. Imp. Acad. Sc. St. Petersb.* 1843, 358.

TEMPERATE HIMALAYA; from Kumaon to Central Nepal, alt. 5–9000 ft. KHASIA MTS., alt. 5–6000 ft. UPPER ASSAM, on the Patkoye Mts., *Griffith*

CEYLON; Central Province, alt. 6–8000 ft., *Walker*, &c.—DISTRIB. Affghanistan, N. China.

A small shrub, 1–3 ft. *Leaves* 1–3 in., thin, variable in breadth, sometimes faintly pubescent above and glabrous beneath, base cuneate; petiole ⅛ in., with often a minute white bud in the axil. *Peduncle* slender, silky, rarely ⅛ in.; flowers often at length spicate or even cymose. *Perianth* ¼–⅓ in. long. *Disk-scales* linear. *Fruit* ¼ in. long, narrowly ovoid, silky; pericarp black, thin. *Embryo* large, in a thin layer of albumen, cotyledons flat oblong, radicle half its length.—Most of the species included here under *W. canescens* are founded on the cohesion or freedom of the hypogynous scales, which organs vary greatly in this and other genera of the Order. It is remarkable that this genus should not occur in the Nilghiris.

5. **STELLERA,** *Linn.*

Herbs undershrubs or shrubs. *Leaves* alternate. *Flowers* 2-sexual, in terminal sessile heads or spikes. *Perianth-tube* cylindric, at length circumsciss above the ovary; lobes 4, rarely 5, spreading; scales 0. *Stamens* 8, rarely 10, 2-seriate; anthers subsessile. *Disk* produced on one side into a lanceolate or linear blade. *Ovary* subsessile, 1-celled; style short, stigma capitate. *Fruit* dry, included in the base of the perianth, pericarp membranous.—Species about 6, Central and W. Asia.

S. Chamæjasme, *Linn. Amœn. Acad.* i. 400; a glabrous herb, stems erect simple leafy, leaves sessile elliptic-lanceolate acute or acuminate, heads involucrate. *Meissn. in DC. Prodr.* xiv. 2. 549. S. hypericifolia, *Endl. Gen. Suppl.* 4. ii. 63; *Meissn. l. c.* S. concinna, *Edgew. in Trans. Linn. Soc.* xx. 88; *Meissn. l. c.* S. altaica, *Thieb. in Pers. Synops.* i. 436; *Meissn. l. c.* Passerina Stelleri, *Wikstr. in Act. Holm.* 1818, 321. P. racemosa, *Wikstr. l. c.* 320; *Ledeb. Ic. Pl. Ross.* t. 374. Wikstrœmia ? hypericifolia, *Meissn. in Denksch. Regensb. Bot. Gesellsch.* iii. 287*. Septas hypericifolia, *Wall. Cat.* 1048.

WESTERN HIMALAYA; Kumaon and Garwhal, alt. 10–11,000 ft., *Wallich*, &c.—DISTRIB. Westward to the Caucasus, N. and Central Asia.

Rootstock long, woody; stems quite simple, rather stout, 6–10 in. high. *Leaves* opposite and alternate, ½–1 in., thin, veined, base rounded or cuneate, involucral like the cauline. *Flowers* in a sessile head, sweet-scented, yellow. *Perianth* ½–⅔ in. long, glabrous, tube slender; lobes very short, oblong.

6. **DIARTHRON,** *Turcz.*

Slender annuals. *Leaves* scattered, linear. *Flowers* minute, 2-sexual, in lax terminal racemes, ebracteate. *Perianth-tube* slender or urceolate, constricted and circumsciss above the ovary; lobes 4, spreading; scales 0. *Stamens* 8, 2-seriate; anthers subsessile. *Disk* 0. *Ovary* subsessile, glabrous, 1-celled; style short, stigma ovoid subclavate. *Fruit* dry, enclosed in the membranous base of the perianth, pericarp membranous. *Testa* crustaceous, albumen sparing or 0.—Species 2, Persia and Central Asia.

D. vesiculosum, *Fisch. & Mey. in Bull. Soc. Imp. Mosc.* 1839, 170; annual, slender, erect, leafy, leaves sessile linear obtuse or subacute, perianth-tube with 8 ridges, stamens 8. *Meissn. in DC. Prodr.* xiv. 2. 558; *Boiss. Fl. Orient.* iv. 1054. D. carinatum, *Jaub. & Sp. Ill. Pl. Or.* t. 105. Passerina costata, *Griff. Notul.* iv. 367, and *Ic. Pl. Asiat.* t. 535.

The PANJAB; Peshawur, *Vicary.* WESTERN TIBET; Iskardo, alt. 9000 ft., *Clarke.*—DISTRIB. Soongaria, Affghanistan, Persia.

A slender annual, 6–12 in., usually copiously dichotomously branched. *Leaves* ½-⅔ in., nerveless, rather glaucous. *Racemes* very slender, flowering ¼ in. long, fruiting 1 in.; flowers very shortly pedicelled. *Perianth* ⅙ in. long, tube very slender, lobes short. Lower *anthers* smaller than the upper. *Fruit* 1/12–1/10 in. long, narrowly ovoid, perianth-tube membranous (vesicular when the fruit does not ripen).

7. LASIOSIPHON, *Fresen.*

Silky shrubs. *Leaves* opposite or scattered. *Flowers* 2-sexual, in dense heads with broad bracts. *Perianth-tube* cylindric, circumsciss above the ovary; lobes 5, spreading; scales above the stamens 5–10. *Stamens* 10, upper or all shortly exserted; anthers oblong or linear. *Disk* 0 or short, annulate. *Ovary* sessile, 1-celled; style filiform, stigma capitate. *Fruit* small, dry, included in the base of the perianth, pericarp membranous. *Testa* crustaceous; albumen scanty or 0.—Species about 25, Trop. and S. African and Trop. Asiatic.

L. eriocephalus, *Dcne, in Jacquem. Voy. Bot.* 148; leaves subsessile from oblong to linear-oblong -lanceolate or oblanceolate acute glabrous or silky beneath, heads globose shortly peduncled, bracts hoary deciduous, perianth densely villous with long silky hairs. *Meissn. in DC. Prodr.* xiv. 2. 597; *Thwaites Enum.* 250; *Beddome For. Man.* 179, t. 25, f. 2. L. speciosus, *Dcne. l. c.* 147, t. 150; *Meissn. in DC. l. c.* 598; *Dalz. & Gibs. Bomb. Fl.* 221. L. sisparensis, Hugelii ? and insularis, *Meissn. in DC. l. c.* L. Metzianus, *Miq. Analect. Bot.* ii. 3, t. 1. Daphne eriocephala, *Wall. Cat.* 1051. Lachnæa eriocephala, *Heyne mss.* Gnidia eriocephala, *Meissn. in Regensb. Denkschr.* iii. 292; *Wight Ic.* t. 1859. G. sisparensis, *Gardn. in Calc. Journ. Nat. Hist.* 1; *Wight Ic.* t. 1860; G. insularis, *Gardn. l. c.* G. monticola, *Miq. in Flora* 1849, 557.

DECCAN PENINSULA; on the Ghats from the Concan southwards, ascending to 7000 ft. on the Nilghiris. CEYLON, ascending to 4000 ft.

A small tree or large much-branched bush, with much of the habit of *Edgeworthia Gardneri*; branchlets usually purplish. *Leaves* 2–3 by ¾–1 in., not coriaceous, narrowed from the middle or above it to the rounded base, nerves very slender and oblique. *Heads* 1–2 in. diam.; involucral bracts oblong, acute, silky, shorter than the flowers, which are very numerous, densely packed and thickly clothed with white or buff long silky villous hairs. *Perianth* ½-¾ in. long, yellow; tube slender; lobes 4–5, oblong, obtuse; scales at its mouth very variable, oblong obcordate or 2-fid.—I can find no valid characters whereby to distinguish the 5 species here brought together, for which Decaisne and Meissner rely chiefly on the shape of the perianth-scales, and Thwaites has united both *speciosus* and *zeylanicus* with *eriocephalus*. The scales are described as minute obovate and notched in *L. eriocephalus*; obcordate in *L. sisparensis*; linear and bifid in *L. speciosus*; linear and entire in *L. Metzianus*, and small linear and fleshy in *L. insularis*. Wight further characterizes *L. sisparensis* by the tawny brown heads. *L. Hugelii*, Meissn., said to be from the Himalaya, is probably founded on an erroneously ticketed plant, for no species of the genus is known from that region, and Hugel collected in the Nilghiris; Decaisne indeed referred Hugel's plant doubtfully to *L. eriocephalus* itself. Beddome confirms this view of the species thus brought under one.

8. LINOSTOMA, *Wall.*

Shrubs sometimes climbing. *Leaves* opposite or subopposite. *Flowers* 2-sexual, in small panicled cymes; bracts 2, on the peduncle, at length greatly enlarged and membranous. *Perianth-tube* cylindric, base at length turgid, lobes 5, spreading; scales above the stamens 10, free or connate in pairs. *Stamens* 10, filaments filiform, exserted; anthers ovoid or oblong. *Disk* 0. *Ovary* sessile, 1-celled; style filiform, stigma penicillate. *Fruit* ovoid, included or not in the inflated base of the perianth, pericarp dry corky or crustaceous. *Testa* membranous, albumen 0.—Species 5 or 6, Indian and Brazilian.

1. **L. pauciflorum;** *Griff. in Calc. Journ. Nat. Hist.* iv. 234, *in note*; quite glabrous, leaves 1–1¼ in. very shortly petioled elliptic or obovate apiculate, peduncle slender 1–2-fld., perianth glabrous, tube slender. *Meissn. in DC. Prodr.* xiv. 2. 600; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334. Psilæa dalbergioides, *Miquel Fl. Ind. Bat. Suppl.* 355.

TENASSERIM; in the Pine forests of Martaban, alt. 3–4000 ft., *Kurz.* SINGAPORE, *Griffith, Maingay.*—DISTRIB. Sumatra.

An erect shrub, 4–6 ft.; branches long, slender, black when dry. *Leaves* thin, rather glaucous beneath; nerves very numerous, spreading, parallel, slender; petiole 1/12 in. *Peduncle* filiform, 1–2 in.; bracts leaf-like, but thinner, white, translucent; flowers few, nodding, greenish-white; pedicel short, slender. *Perianth* ¾ in. long, very slender; lobes linear-oblong; scales clavate. *Fruit* ½ in. long, excluding the persistent perianth-lobes, quite glabrous, ellipsoid but narrowed above and below, perianth-tube with 10 slender ridges; pedicel swollen at the tip, pericarp coriaceous.

2. **L. decandrum,** *Wall. Cat.* 4203; quite glabrous, leaves 2–3 in. petioled oblong or oblong-lanceolate acuminate, peduncle many-fld., perianth glabrous, tube ovoid. *Meissn. in DC. Prodr.* xiv. 1. 599; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334; *Griff. Notul.* iv. 372. Nectandra decandra, *Roxb. Fl. Ind.* ii. 425.

SILHET, *Roxburgh.* CHITTAGONG, at Seetakoond, *J. D. H. & T. T.* TENASSERIM, *Kurz.*

An erect evergreen shrub; branches slender, dark, speckled with white. *Leaves* coriaceous, red-brown when dry, sometimes caudate-acuminate; nerves exceedingly slender and numerous; petiole ⅙–¼ in. *Peduncle* 2–3 in., rather stout, 6–10-fld.; bracts sessile, oblong, obtuse or acute, smaller than the leaves. *Flowers* umbellate, greenish-white, fragrant; pedicels ¼ in. long, jointed in the middle under the flower. *Perianth-tube* quite glabrous, ¼ in. long; lobes linear, as long as the tube; scales erect, clavate. *Fruit* ⅓ in. long, broadly ellipsoid, acute above and below, perianth-tube sparingly silkily villous.

3. **L. scandens;** *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334; finely rusty-tomentose, leaves 2–3 in. petioled broadly oblong or elliptic, tip rounded or retuse, flowers in panicled peduncled heads or umbels. Enkleia malaccensis, *Griff. in Calc. Journ. Nat. Hist.* iv. 234 *in note*, and *Notul.* iv. 363. L. siamense, *Kurz in Journ. As. Soc. Beng.* 1870, ii. 83, and *For. Fl.* ii. 334. Lasiosiphon scandens, *Endl. Gen. Pl. Suppl.* iv. pt. 2, 67; *Meissn. in DC. Prodr.* xiv. 2. 598.

PEGU and TENASSERIM, *Kurz.* MALACCA, *Griffith.* SINGAPORE, *Schomburgk, Maingay.*

A lax climbing shrub with long decurved branches. *Leaves* sometimes acute at the top and subcordate at the base, coriaceous, nearly glabrous except the midrib above, nerves arched; petiole ¼–⅓ in. *Peduncles* stout, fruiting 1–3 in. long; bracts leaf-like, but thinner. *Flowers* imbricate, rusty-pubescent, greenish-brown. *Perianth-tube* cylindric; lobes 5, ovate; scales white, petaloid. *Fruit* nearly ½ in. long, subglobose, on a short stout pedicel, ribbed, often bearing at its base the split perianth-tube, tip conical, glabrous, marked by two opposite whitish-yellow lines.—My specimens have no flowers, and the description is taken from Griffith. I have seen no Tenasserim specimens. Kurz's *L. siamense* is identical with *scandens*.

9. PHALERIA, *Jack.*

Trees. *Leaves* opposite. *Flowers* 2-sexual, in terminal or lateral sessile heads; bracts involucriform, leafy, deciduous. *Perianth-tube* elongate; lobes 4–6; spreading; scales 0. *Stamens* 8–12, 2-seriate, exserted, filaments filiform; anthers small. *Disk* cupular or annulate. *Ovary* 2-celled; style filiform, stigma capitate. *Drupe* naked, succulent or fleshy, endocarp coriaceous or hard, 1–2-celled. *Testa* thin; albumen 0.—Species about 8, Eastern Asiatic, Malayan and Australian.

P. cauliflora, *Benth. in Gen. Pl.* iii. 199; quite glabrous, leaves 6–9 in. shortly petioled oblong-lanceolate or oblanceolate caudate-acuminate base acute, flowers in subsessile heads on the sides of the branches, perianth glabrous, margins of lobes pubescent. *Beddome For. Man.* 180, t. 25, f. 5. Drymispermum cauliflorum, *Thwaites Enum.* 251.

CEYLON; in the Pasdoon Corle, *Thwaites.*

A small elegant tree, with long subpendulous branches. *Leaves* shining, green, rather membranous, base acute; nerves very slender, 8–10 pair, rather arched; petiole ⅛ in. *Perianth* ⅜ in. long, tube slender; lobes rounded. *Fruit* ⅜ in. long, almost as broad, obliquely obovoid or turgid, subacute, narrowed into a short stipes, fleshy, red.

10. GYRINOPS, *Gærtn.*

Trees. *Leaves* alternate, shining. *Flowers* 2-sexual, in terminal sub-panicled umbels, ebracteate. *Perianth-tube* slender; lobes 5, spreading; scales above the stamens connate in a ring. *Stamens* 5; anthers subsessile, connective very thick. *Disk* 0. *Ovary* long-stalked, 2-celled; style subulate, stigma ovoid. *Capsule* stipitate, compressed, loculicidally 2-valved. *Seeds* ovoid, with a long tail-like appendage, testa crustaceous, inner coat thick, albumen 0.—Species 2, a South Indian and Moluccan.

G. Walla, *Gærtn. Fruct.* ii. 276, t. 140; glabrous except the silky shoots and young foliage, leaves oblong or elliptic caudate-acuminate, nerves very slender. *Meisn. in DC. Prodr.* xiv. 602; *Hook. Ic. Pl.* t. 5; *Wight Ic.* t. 1850; *Bedd. Fl. Sylv.* t. 303.

CEYLON, common in the warmer parts.

A tree with slender branches and yellowish foliage of a light brown when dry. *Leaves* 2–3 in., very variable in breadth, base acute; nerves mere striations, transverse, very closely placed; petiole very short. *Umbels* few-fld., very shortly peduncled. *Perianth* ⅓ in. long; tube slender, acute at the base; lobes very short, rounded, pubescent within.—In Gen. Plant. iii. 200, this is erroneously said to be a native of the Indian Peninsula.

11. AQUILARIA, *Lamk.*

Trees. *Leaves* alternate; nerves slender, parallel. *Flowers* 2-sexual, in axillary and terminal peduncled or subsessile umbellules, ebracteate. *Perianth* campanulate; lobes 5, broad, spreading; scales above the stamens 5, hairy, connate at the base. *Stamens* 10; anthers subsessile, oblong; connective broad. *Disk* 0. *Ovary* subsessile, villous, perfectly or imperfectly 2-celled; stigma large, subsessile. *Capsule* compressed, oblanceolate or obovate, loculicidal; pericarp coriaceous or hard and woody. *Seeds* of *Gyrinops.*—Species 2 or 3, E. Asiatic, Malayan and Chinese.

1. **A. Agallocha,** *Roxb. Cat.* 33, and *Fl. Ind.* ii. 422; nearly glabrous

except the silky shoots, leaves petioled linear-oblong or lanceolate or oblanceolate caudate-acuminate, fruit 1½–2 in. oblanceolate acuminate thinly coriaceous glabrous. *DC. Prodr.* ii. 59; *Meissn. in DC. l. c.* xiv. 2. 601; *Wall. Cat.* 7250; *Roxb. & Coleb. in Trans. Linn. Soc.* xxi. 199, t. 21; *Royle Ill.* 173, t. 36, f. 1; *Kurz For. Fl.* ii. 335; *Miquel Fl. Ind. Bat.* i. pt. 1, 882; ? *Griff. Notul.* iv. 358.—Gyrinopsis species Assamica, *Benth. in Gen. Pl.* iii. 200.

EASTERN HIMALAYA; Bhotan, *Griffith.* ASSAM, *Hamilton.* KHASIA MTS., SILHET and TIPPERA HILLS, *Roxburgh*, &c. MARTABAN HILLS, *Kurz.*

A large evergreen tree. *Leaves* 2–3½ in., thinly coriaceous, shining, sometimes subsilky on the nerves beneath, nerves very many and faint; petiole 1/10 in. *Umbels* very many-fld., sessile or shortly peduncled, silky; flowers white, about equalling their pedicels or shorter. *Perianth* persistent in fruit, ¼–⅓ in. broad and long, silky without, densely villous within; lobes rounded, ovate, equalling the turgid turbinate tube; scales villous.—I have seen no Martaban specimens, which are described by Kurz as having obovate-cuneate densely tomentose capsules. The figure in the Linnæan Transactions represents a short broad thick capsule, quite like that of *A. malaccensis*, and very different from those of the Bhotan and Khasian *A. Agallocha.* Griffith does not describe the fruit, and I am hence in doubt whether the plant of the Notulæ is this or *malaccensis*; he gives Mergui as a habitat, whence I have seen no specimens.—Eagle or Aloe-wood; Aggur, *Beng.*

2. **A. malaccensis,** *Lamk. Dict.* i. 49, and *Ill.* t. 356; glabrous, except the silky shoots, leaves oblong-lanceolate shortly obtusely caudate-acuminate, fruit 1 in. broadly obovoid very thick and woody when ripe. *DC. Prodr.* ii. 59; *Meissn. in DC. l. c.* xiv. 2. 601, *excl. citat. of Benth.*; *Dict. Sc. Nat.* t. 248; *Kurz For. Fl.* ii. 236. A. ovata, *Cav. Diss.* vii. 377, t. 224.—*Rumph. Amb.* ii. 34, t. 10.

MALACCA, *Griffith, Maingay.* TENASSERIM ? *Kurz.*—DISTRIB. Malay Islands.

Very similar to *A. Agallocha* in foliage, which is however rather smaller, and it differs in the much smaller flowers and short broad woody capsule, the valves of which are ½ inch thick at the suture.—The Honble. C. Smith sends from Perak, under the name of Kaya tang Karus, the foliage of what may be another species, the leaves being much broader, with much longer acuminate tail-like points; it produces Garu, (Taras Gharu, *Griffith*), the name given to the wood of *A. malaccensis.*

ANOMALOUS GENUS (referable to TILIACEÆ.)

GONYSTYLUS, *Teijsm. & Binnend.*

Lofty trees, inner bark not tenacious. *Leaves* alternate, rigid, many-nerved, glabrous. *Flowers* small, bisexual, in axillary and terminal peduncled spicate umbels. *Perianth* short, cup-shaped, 5-cleft, thickly coriaceous, hirsute within, persistent, with a ring of setaceous incurved processes at the base. *Stamens* very numerous, at the base of the perianth, filaments very short; anthers basifixed, elongate, 2-celled, dehiscing lengthwise. *Ovary* 4–6-celled; style filiform, deflexed, stigma clavate 2-lobed; ovules solitary in each cell, pendulous, anatropous. *Fruit* subglobose, 2–5-angled or furrowed, pericarp very thick. *Seeds* pendulous, oblong, curved, exalbuminous.—Species 3 or 4, Malayan.

G. Maingayi, *Hook. f.*; leaves 4–5 in. shortly petioled elliptic-oblong acuminate glabrous base rounded, perianth ⅓ in. diam., fruit ellipsoid 1–1½ in. long obtuse, unequally 2–4-valved, 6-celled with 3 or more cells abortive.

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MALACCA, *Maingay* (*Kew Distrib.* 1441).

A tree; branches woody with black wrinkled bark, the young ones and those of the inflorescence finely grey-pubescent. *Leaves* 1½–2 in. diam., quite glabrous and rather shining above, faintly pubescent on the stout midrib beneath, dark brown when dry; nerves very numerous, parallel and prominent beneath; petiole ½ in. *Inflorescence* apparently forming a narrow erect woody panicle 4–6 in. long with short stout branches. *Fruit* (unripe) smooth, seated on the perianth, the lobes of which are revolute; valves with walls ¼ in. thick, formed of transverse woody fibres; pedicel ½–¾ in. long. *Seeds* (quite unripe) ⅓–¾ in. long, semicircular, quite flat.—This differs from the Javan *G. Miquelianus*, Teijsm. & Binn. (in Bot. Zeit. 1862, 265, Miquel Ann. Mus. Lugd. Bat. i. 132, f. 4), in the much smaller flower and fruit. *G. bancanus* again has flowers very much smaller than in *G. Maingayi.* For the reference of this genus to *Tiliaceæ* see Baillon, Hist. Pl. vi. 122, and Adansonia, xi. 327.

ORDER CXXXI. **ELÆAGNACEÆ.**

Shrubs or trees, with copious silvery or brown scales. *Leaves* alternate or opposite, quite entire, exstipulate. *Flowers* small, regular, 1–2-sexual, in axillary fascicles or cymes, white or yellow. *Perianth* in the 2-sexual and female fl. tubular, 2–6-cleft, in the male of *Hippophae* of 2 membranous sepals. *Stamens* adnate to the perianth-tube, in the male fl. twice as many as the lobes, in the 2-sexual as many as the lobes and opposite them. *Ovary* free, 1-celled; style filiform, stigma lateral; ovule 1, basal, erect, anatropous. *Fruit* indehiscent, enclosed in the perianth-tube. *Seed* ascending, albumen 0 or scanty; embryo straight, axile, cotyledons thick, radicle inferior.—Genera 3, species 16, North Temp. and Tropical regions.

Perianth 4-fid . . . . 1. ELÆAGNUS.
Perianth of ♂ 2-partite, membranous, of ♀ 2-fid . . . . 2. HIPPOPHAE.

1. **ELÆAGNUS,** *Linn.*

Perianth-tube oblong or globose, constricted above the ovary; limb valvately 4-cleft, deciduous. *Stamens* 4, on the mouth of the corolla. *Style* linear, included, stigma lateral.—Species about 12.

1. **E. hortensis,** *M. Bieb. Fl. Taur. Cauc.* ii. 112; arboreous, branches dark brown, leaves deciduous ovate-oblong or linear-oblong silvery beneath, flowers 1–3-nate, fruit ellipsoid-oblong, endocarp thick bony. *Schlecht. in DC. Prodr.* xiv. 609; *Boiss. Fl. Orient.* iv. 1056; *Brand. For. Fl.* 389. E. angustifolia, *Linn.*; *Reichb. Ic. Fl. Germ.* xi. t. 549; *Sibth. Fl. Græc.* t. 152; *Bot. Reg.* t. 1156. E. orientalis, *Linn. Mant.* 41; *Pall. Fl. Ross.* i. 11, t. 5. E. Moorcroftii, *Wall. Cat.* 4031; *Schlecht. in DC. l. c.* 610.

WESTERN TIBET, alt. 5–10,500 ft., *Moorcroft*, *Thomson*, &c. WESTERN HIMALAYA, alt. 6–7000 ft., *Edgeworth.*—DISTRIB. Westwards to Spain, Western and Central Asia to China.

A tree, 12–30 ft. high, often spinous, young silvery. *Leaves* 1–3 in., obtuse, nerves faint; petiole ¼ in. *Flowers* pedicelled, yellow, fragrant. *Perianth* ⅙–¼ in. long, silvery, campanulate above, teeth triangular-ovate. *Style* glabrous. *Fruit* ¾ in. long, red, dry or fleshy.

2. **E. umbellata,** *Thunb. Fl. Jap.* 66, t. 14; shrubby, leaves deciduous oblong-lanceolate silvery beneath, flowers clustered, fruit small ellipsoid and contracted at both ends or subglobose, endocarp coriaceous ribbed woolly within. *Schlecht. in DC. Prodr.* xiv. 614; *Maximov. Diagn. Dec.* viii. 560; *Brand. For. Fl.* 391; *Gamble Man. Ind. Timb.* 318. E.

parvifolia, *Wall. Cat.* 4026; *Royle Ill.* 323, t. 81, f. 1; *Bot. Reg.* xxix. t. 51. E. reflexa, *Dcne. & Morren in Ann. de Hort. Paris*, 1841.

TEMPERATE HIMALAYA; from Kashmir to Nepâl, alt. 8–10,000 ft.—DISTRIB. Affghanistan, N. China, Japan.

Branches often thorny, not so dark as *E. hortensis.* *Leaves* 1–2½ in., obtuse, glabrous or sparsely pubescent above, nerves obscure; petiole ¼ in. *Flowers* pedicelled, appearing with the leaves, white, fragrant. *Perianth* ⅓ in., silvery, tube slender, narrowly funnel-shaped, teeth broadly triangular-ovate. *Fruit* ⅓ in. long, succulent.—I follow Maximovicz in referring *E. reflexa* to this, but the only specimen so called that I have seen is from Thuret's garden (Antibes) and is *E. latifolia.*

3. **E. pyriformis,** *Hook. f.*; shrubby, leaves persistent? oblong or elliptic subsilvery beneath, flowers clustered, fruit very small very shortly pedicelled pyriform acute at both ends, endocarp crustaceous smooth glabrous within.

UPPER ASSAM; Mishmi Hills, or the Lohits near Koondilak, *Griffith.*

Branches brown, none silvery, obscurely scaly. *Leaves* 2–3 in., obtuse or subacute, rusty-brown above when dry, young only silvery beneath, older discoloured; petiole ⅛–¼ in. *Flowers* not seen. *Fruit* ¼–⅓ in. long, turgid, clothed with appressed brown hardly shining scales, turbinately narrowed below; top mammillate or beaked.—The fruit is quite unlike that of any other species.

4. **E. latifolia,** *Linn. Sp. Pl. Ed.* 2, 177 (*excl. syn.*); shrubby, erect or scandent, leaves ovate oblong elliptic or almost rounded obtuse or acute, silvery or rusty beneath, flowers usually many in a cluster, fruit large linear-oblong, endocarp coriaceous ribbed woolly within. *Schlecht. in DC. Prodr.* xiv. 610; *Maximov. Diagn.* viii. 560; *Brand. For. Fl.* 390, t. 46; *Wight Ic.* t. 1856; *Wall. Cat.* 4028; *Gamble Man. Ind. Timb.* 317; *Beddome, Fl. Sylv.* t. 180; *Thwaites Enum.* 252 (*excl. syn. parvifolia*). E. conferta, *Roxb. Fl. Ind.* i. 440, and *Ed. Carey & Wall.* i. 460; *Kurz For. Fl.* ii. 331. E. arborea, *Roxb. l. c.* 441, and *Ed. Carey & Wall.* 461; *Schlecht. l. c.* 611; *Wall. Cat.* 4027; *Don Prodr.* 67. E. armata, *Ham. mss.* E. ferruginea, *A. Rich. Monogr. Elæagn.* 387, 404; *Schlecht. l. c.* 610; *Wall. Cat.* 4029. E. Thwaitesii & Wallichiana, *Schlecht. l. c.* 611, 612. E. Kologa, *Schlecht. l. c.*; *Dalz. & Gibs. Bomb. Fl.* 224. E. elliptica, *Herb. Heyne.* E. Simoni, *Hort.*

SUBTROPICAL and TEMPERATE HIMALAYA; from Kumaon, alt. 2–7000 ft., to Sikkim, alt. 5–8000 ft.; Bhotan and the Mishmi Hills. KHASIA MTS., alt. 0–5500 ft. BENGAL, at Comilla, *Clarke.* CHITTAGONG, *J. D. H & T. T.* TENASSERIM, *Griffith.* PENANG, *Maingay.* DECCAN PENINSULA; from the Concan southwards, ascending to 7000 ft. CEYLON, ascending to 5000 ft.—DISTRIB. Burma, Malay Islands, China.

A bush small tree or climber, very variable in habit, trunk sometimes 6 in. diam.; branches often spinescent. *Leaves* 4–5 in., very variable, thin or coriaceous, from almost rounded to elliptic-lanceolate, obtuse acute or acuminate, silvery or bright rusty-red beneath; petiole ¼–⅓ in. *Flowers* often very numerous, pedicel lengthening in fruit. *Perianth* campanulate, lobes very broad. *Fruit* ¾–1¼ in. long, elliptic-oblong, fleshy, red, acid, ribs 8, strong.—Roxburgh figures the flowers as white; they are of a pale yellow, but probably vary.

2. HIPPOPHAE, *Linn.*

Diœcious shrubs or small trees, often spinescent. *Leaves* alternate, narrow. MALE FL. in axillary clusters, bracts deciduous. *Perianth-segments* 2, opposite. *Stamens* 4. FEMALE FL. solitary. *Perianth* tubular, 2-dentate. *Fruit* a membranous utricle enclosed in the succulent perianth.

Seed oblong, testa crustaceous, shining, albumen scanty.—Species 2, Europe and N. Asia.

1. **H. rhamnoides,** *Linn.*;—*Schlecht. in DC. Prodr.* xiv. 607, and in *Linnæa* xxxii. 296; leaves from obovate to linear-oblong, not tomentose, clothed beneath with short silvery or rusty circular scales. *Boiss. Fl. Orient.* iv. 1055; *Reichb. Ic. Fl. Germ.* t. 549; *Brand. For. Fl.* 388; *Gamble Man. Ind. Timbers,* 317. H. tibetana, *Schlecht. in Linnæa l. c.*

NORTH-WESTERN HIMALAYA; in the beds of streams of the inner drier ranges, from Kumaon westwards, alt. 7000–12,000 ft. WESTERN TIBET, ascending to 15,000 ft. —DISTRIB. Affghanistan and westwards to N. and Middle Europe, N. and Central Asia.

A thorny shrub or small tree, with rigid branches and silvery twigs and leaves. *Leaves* ½–2 in., narrowed into the short petiole, above sparsely scaly when young, green and glabrous in age, beneath clothed with circular toothed scales. *Flowers* on the old wood; male minute; perianth-segments oblong; filaments short. *Fruit* in. diam., oblong or globose, orange yellow or scarlet.—Excessively variable in habit, and in the density of the foliage, and the breadth and shape of the leaves.

2. **H. salicifolia,** *Don Prodr.* 68; leaves linear-lanceolate densely clothed beneath with white or rusty stellate hairs and some circular scales. *Schlecht. in DC. Prodr.* xiv. 607, and in *Linnæa* xxxii. 295; *Brand. For. Fl.* 387. H. conferta, *Wall. Cat.* 4032; *Royle Ill.* 323.

TEMPERATE HIMALAYA, from Jamu to Sikkim, alt. 5–10,000 ft.

A willow-like shrub, 10–20 ft., with lateral thorns. *Leaves* 2–4 in., dull green and glabrous or pubescent above, margins usually recurved, midrib often rusty red. *Flower* as in *H. rhamnoides,* but fruit smaller (always?).—Different as this plant looks in its ordinary condition from *H. rhamnoides,* I expect that it will prove a form of that plant due to the moister climate which it affects.

ORDER CXXXII. LORANTHACEÆ.

Parasitic evergreen shrubs. *Leaves* usually opposite, entire, exstipulate, sometimes absent. *Flowers* 1–2-sexual, racemed spicate or fascicled, usually bracteate and often 2-bracteolate. *Calyx* adnate to the ovary, limb truncate or 0, rarely toothed. *Petals* 4–8, free or connate, valvate in bud. *Stamens* equal to and opposite the corolla-lobes, usually inserted on them. *Ovary* inferior, 1-celled; style short or long, stigma simple; ovule 1, erect, adnate all round to the walls of the ovary. *Fruit* a 1-seeded berry or drupe. *Seed* adnate to the pericarp, albumen fleshy; embryo straight, radicle superior.—Genera 13, native of tropical and a few of temperate countries; species about 500.

Flowers 2-sexual . . . . 1. LORANTHUS.
Flower 1-sexual.
  Anthers adnate to the petals, opening by pores . . . . . 2. VISCUM.
  Anthers on the middle of the petals, dehiscing transversely 3. ARCEUTHOBIUM.
  Anthers at the base of the petals, many-celled . . . . 4. NOTOTHIXOS.
  Anthers at the base of the petals, 2-celled . . . . . . 5. GINALLOA.

1. LORANTHUS, *Linn.*

Leaves opposite or alternate. *Flowers* 2-sexual. *Petals* free or more or less connate into a tubular corolla with spreading tips. *Stamens* inserted on the petals, anthers adnate or versatile, cells parallel.—Species about 350, mostly tropical.

SECT. I. **Euloranthus.** *Flowers* small, under ¼ in.; bract scale-like or hollow; bracteoles 0. *Petals* 4–6, free. *Anthers* ovate or oblong, base obtuse, cells unequal or one suppressed.

1. **L. odoratus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 215, and *Cat.* 505; quite glabrous, leaves subopposite elliptic or lanceolate, flowers minute opposite or fascicled on axillary spikes, petals 6 free. *Don Prodr.* 143; *DC. Prodr.* iv. 294. L. hexapetalus, *Ham. mss.*

NEPAL, *Wallich*; E. Nepal and Sikkim, alt. 7000 ft., *J. D. H.* Khasia Mts. on oaks, alt. 5–6000 ft., *Griffith, J. D. H. & T. T.* (*Loranth.* 27, 28).

Bushy, bark dark. *Leaves* 3–5 in., fleshy, narrowed into a petiole, often falcate, penninerved, nerves slender. *Spikes* 1–2½ in., strict, solitary or fascicled; flowers ⅛–⅙ in., yellowish, sweet-scented. *Ovary* with the base sunk in the rachis; calyx-limb short; style very stout, stigma capitate. *Petals* spathulate, ⅛ in. long; buds clavate. *Fruit* ellipsoid, glabrous.

2. **L. Lobbii,** *Hook. f.*; leaves opposite sessile ovate-lanceolate from a rounded or acute base glabrous, flowers minute sessile fascicled in small sessile clusters, calyx rusty-tomentose, petals 4 free puberulous.

PENANG, *Lobb, Maingay* (*Kew Distrib.* 695/2), *Curtis.*

Branches terete; bark pale, obscurely puberulous. *Leaves* 2½–4 in., thickly coriaceous, almost nerveless, obtusely acuminate, minutely impressed-punctate through the contraction of the tissues on both surfaces which are similar. *Flowers* sometimes 1-sexual; clusters 6–20-fld., ¼–⅓ in. diam. *Petals* ⅛ in. long, linear, obtuse, puberulous, free; buds oblong, tip rounded. *Ovary* globose; calyx-limb shortly tubular. *Style* clavate, stigma obtuse. *Fruit* ⅓ in. long, puberulous, ellipsoid.—This is the plant referred to in *Gen. Plant.* iii. 208 as from Moulmein, and possibly *L. axanthus*, Korth. The Moulmein habitat is an error; there are 3 specimens of it in the Kew Herbarium, all from Lobb, and all bear his number 338: of these one is stated to be from Java, a second from Penang, and a third from Moulmein. As, however, Maingay's specimens are from Penang, so no doubt are all the others. It differs from the Sumatran *L. axanthus*, Korth. (Miq. Fl. Ind. Bat. i. 1. 834), in the subsessile leaves and other characters. There are very imperfect specimens of probably this species from Borneo (Beccari, 2378).

3. **L. nodiflorus,** *Thwaites Enum. Pl. Ceyl.* 134; leaves opposite petioled elliptic acute or acuminate glabrous, flowers small sessile fascicled in sessile clusters, calyx rusty-tomentose, petals 4 free glabrous.

CEYLON, *Walker*; in forests of the Ambagamowa District, *Thwaites.*

Branches terete, thickly lenticellate. *Leaves* 2½–3 in., thickly coriaceous, almost nerveless, tissue contracted as in *L. Lobbii*. *Flowers* in small clusters. *Ovary* globose. *Style* filiform, stigma hemispheric; calyx-limb short, dilated. *Petals* ⅓ in. long, linear, obtuse, quite glabrous; buds linear, tip obtuse.

SECT. II. **Phœnicanthemum.** *Flowers* small, not 1 in. long, spicate or racemose, 2-sexual; bract scale-like, bracteoles 0. *Corolla* lobes or segments 4–5, reflexed symmetrically; buds often clavate at the tip. *Anthers* oblong, erect, continuous with the filament, 2-celled. PHŒNICANTHEMUM (Gen.), *Miquel.*

* *Racemes or spikes very many-fld., quite glabrous.*

4. **L. Wallichianus,** *Schultz. Syst.* vii. 100; quite glabrous, leaves opposite and alternate petioled elliptic obtuse penninerved, racemes slender fascicled shorter than the leaves, flowers ¼ in. 4-merous, glabrous, buds straight subcylindric obtuse, ovary smooth. *DC. Prodr.* xvi. 294; *Wight*

Ic. t. 143; *Wight & Arn. Prodr.* 381; *Dalz. & Gibs. Bomb. Fl.* 109. L. polystachyus, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wall. Cat.* 509. L. terrestris & tetrandrus, *Heyne mss.*

DECCAN PENINSULA; on the Western Ghats, from the Concan southwards.

Branches terete, bark pale, dotted. *Leaves* 2½–4 in., very coriaceous, base acute, nerves slender; petiole ⅓ in., stout. *Racemes* 1–3 in., suberect; pedicels ⅛–⅙ in.; bract concave, gibbous. *Flower* erect, then spreading, pale red. *Ovary* globose; calyx-limb annular. *Corolla* 4-cleft; style slender, stigma capitate. *Fruit* ⅓ in., ovoid, rugose,

5. **L. intermedius,** *Wight mss.*; quite glabrous, leaves opposite and alternate petioled elliptic or broadly ovate obtuse penninerved, racemes rather stout solitary or fascicled shorter than the leaves, flowers ⅓–⅔ in. 4-merous glabrous, buds curved subcylindric, ovary smooth. L. Blumeanus, *Wight mss. in part.*

DECCAN PENINSULA; Shevagerry Hills and Khalsa Range, alt. 3500 ft., *Wight* (*Kew Distrib.* 1234). Nilghiri and Kurg Mts., *G. Thomson* (*Loranth.* 37, *Herb. H. f. & T.*).

Very near *L. Wallichianus*, and perhaps a large state of that plant, but the leaves are larger and broader, the racemes more robust, and flowers much larger. It is intermediate between *R. Wallichianus* and *R. obtusatus.*

6. **L. obtusatus,** *Wall. Cat.* 526; glabrous, leaves subopposite long-petioled ovate or elliptic obtuse penninerved, racemes solitary stout shorter than the leaves, flowers ¾–1 in. 4-merous glabrous, buds 4-angled, ovary rugulose. *Wight & Arn. Prodr.* 381; *Dalz. & Gibs. Bomb. Fl.* 109. L. Blumeanus, *Wight mss. in part.*

DECCAN PENINSULA; on the Ghats from the Concan southwards.

Branches robust, lenticellate, bark pale. *Leaves* 3–5 in., sometimes 3½ in. diam., very coriaceous, nerves slender; petiole ¾–1 in. *Racemes* strict, erect; flowers crowded or scattered; pedicels ⅙–¼ in. *Ovary* ovoid; calyx angular. *Corolla* not swollen at the base. *Style* slender, stigma capitate. *Fruit* ovoid, closely rugulose. — The petiole is much longer in this than in *Wallichianus* and *intermedius.*

7. **L. pulcher,** *DC. Prodr.* iv. 295; quite glabrous, leaves opposite and alternate shortly petioled oblong- or ovate-lanceolate acuminate penninerved, spikes or racemes subterminal solitary or fascicled, rachis very robust, flowers ¼ in. 5-merous glabrous, buds straight constricted in the middle obtuse terete. L. speciosus, *Wall. Cat.* 518. L. coccineus, *Hook Bot. Misc.* t. 58 (*not of* p. 278). Dendrophthoe pulcher, *Miq. Fl. Ind. Bat.* i. pt. 1, 821.

PENANG, *Porter, Phillips.*.

Branches robust, terete; bark pale, smooth. *Leaves* 5–7 in., very coriaceous, pale and shining above, nerves faint spreading; petiole ⅙ in., very robust. *Racemes* or spikes strict, rather dense-fld. to the base, rachis stout, terete, pedicels 1/16–⅙ in. stout; flowers erecto-patent, red; bract boat-shaped. *Ovary* short; calyx-limb annular. *Corolla-base* rather inflated, terete, tip 5-cleft. *Style* rather stout, stigma hardly capitate. —I think the figure in Bot. Misc. given as of *L. coccineus* undoubtedly is a 4-merous form of *L. pulcher.*

8. **L. Parishii,** *Hook. f.*; glabrous, leaves subopposite petioled linear-lanceolate acuminate penninerved, spikes terminal longer than the leaves strict very robust, flowers ¼ in. 4–5-merous hoary, buds terete obtuse.

TENASSERIM; on Donnatoung, alt. 2000 ft., *Parish.*

Branches very stout; bark black, smooth, shining. *Leaves* 5–7 by 1–1½ in.

very coriaceous, smooth and shining, and probably flaccid when fresh; nerves many, horizontal, very obscure; base narrowed into a stout petiole ½ in. *Spike* erect, many-fld.; rachis very stout, naked towards the base; flowers erecto-patent, scarlet, quite sessile; bract boat-shaped; calyx subglobose, limb obsolete. *Corolla* 4–5-cleft to the middle; bud more swollen at the top than the base. *Style* stout, stigma capitate.—A very distinct plant.

9. **L. ensifolius,** *Thwaites Enum.* 134; quite glabrous, leaves sub-opposite petioled narrowly falcately lanceolate acuminate 3–7-nerved, nerves parallel, racemes axillary and terminal slender equalling the leaves or shorter, pedicels slender, bracteole minute.

CEYLON; at Ratnapoora, alt. 1000 ft., *Thwaites*.

Branches black and opaque when dry. *Leaves* 3–5 by 1–1½ in., thinly coriaceous, opaque, dark brown when dry, narrowed into a petiole ¼–½ in. *Racemes* solitary or 2 together, erect; pedicels ⅙ in. *Ovary* ellipsoid; calyx-limb annular. *Corolla* unknown. *Style* filiform, ¾ in.; stigma capitellate.—The parallel nerves at once distinguish this species.

10. **L. pentapetalus,** *Roxb. Fl. Ind.* i. 553; ii. 211, and *Ed. Carey & Wall.* ii. 290; quite glabrous, leaves opposite and alternate petioled ovate or elliptic acute or acuminate penninerved, spikes axillary erect strict stout longer than the leaves, flowers ¼ in. 4–5-merous, glabrous base suddenly inflated and 5-angled, style jointed at the middle. *DC. Prodr.* iv. 295; *Wall. Pl. As. Rar.* iii. t. 225, and *Cat.* 503; *Kurz For. Fl.* ii. 322; *Griff. Notul.* iv. 617, and *Ic. Pl. Asiat.* t. 624, 625; *Blume Fl. Jav. Loranth.* 39, t. 14, and 23 A. L. polycarpus, *Wall. Cat.* 540. L. erythrostachyus, *Wall. mss.* Phœnicanthemum pentapetalum, *Miq. Fl. Ind. Bat.* i. pt. 1, 823. Dendrophthoe pentapetala, *G. Don Gen. Syst.* iii. 419.

NEPAL, *Wallich, J. D. H.*, and from ASSAM, SILHET and CACHAR to MALACCA, PENANG and SINGAPORE, *Maingay* (*Kew Distrib.* 691, 692).—DISTRIB. Ava, Yunan, Java, Sumatra, Borneo.

Branches stout, terete; bark dark, smooth. *Leaves* 2–4 in., coriaceous, dark brown or black when dry, nerves very faint; petiole ¼–⅜ in., rather slender. *Spikes* solitary and in pairs, dense- or lax-fld.; rachis very stout, naked below; flowers erect, then spreading, quite sessile; bracteole ovate, ciliolate. *Ovary* terete; shortly cylindric; calyx-limb annular, obscurely toothed. *Corolla-lobes* reflexed from the middle; bud constricted in middle, tip clavate. *Style* slender above the joint, stigma capitellate. *Fruit* ellipsoid, truncate.—The style of this species is very characteristic, the lower part where embraced by the corolla-tube being 5-angled.

** *Racemes or spikes very many-flowered, pubescent or tomentose.*

11. **L. coccineus,** *Jack in Mal. Misc.* i. 8, and in *Hook. Bot. Misc.* i. 278 (*excl.* t. 58); rusty-tomentose, leaves opposite and alternate petioled ovate or ovate-lanceolate acute or acuminate base rounded or cordate, spikes or racemes axillary strict erect, pedicels very short, corolla ⅓ in. 4-cleft straight, base rather swollen and 4-angled, fruit ovoid long-necked. *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 215; *DC. Prodr.* iv. 296; *Griff. Notul.* iv. 620, and *Ic. Pl. Asiat.* t. 626. L. racemiferus, *Wall. Cat.* 539. Phœnicanthemum coccineum & Bennetianum, *Miq. Fl. Ind. Bat.* i. pt. 1, 825, 826. Dendrophthoe coccinea, *G. Don Gen. Syst.* iii. 419.

CACHAR, *Keenan.* PEGU, *M'Clelland.* TENASSERIM, *Wallich*, &c. MALACCA, *Griffith* (*Kew Distrib.* 2718). SINGAPORE, *Jack.*—DISTRIB. Ava, Barilla, Borneo.

Branches long, terete, stout, lenticellate; bark pale. *Leaves* 3–6 in., very coriaceous, variable in size and shape, nerves very faint; petiole ¼–½ in. *Spikes or racemes* very variable in length; rachis stout; pedicels very short and stout; bracteole gibbosely boat-shaped; flowers scarlet. *Ovary* ovoid; narrowed below the cupular 4-toothed calyx-limb. *Corolla-segments* spreading, narrow. *Style* slender, stigma capitate. *Fruit* flagon-shaped, neck crowned by the 4-toothed calyx.—It is curious that Jack does not describe the inflorescence of his *L. coccineus* as being pubescent. —Under *L. pulcher* I have referred to the figure given in the Bot. Misc. as *L. coccineus*.

12. **L. Hookerianus,** *Wight & Arn. Prodr.* 381; young leaves and inflorescence mealy or rusty-pubescent, leaves subopposite petioled oblong- or elliptic-ovate or lanceolate obtuse or subacute penninerved, spikes axillary strict erect about equalling the leaves, flowers ¼ in. puberulous 4-merous, buds subterete, ovary depressed-globose, calyx-limb 4-lobed. *Thwaites Enum.* 134.

Deccan Peninsula; at Courtallam, *Wight*. Ceylon; Batticaloa, *Gardner*; Central Province, *Thwaites*.

Branches terete, lenticellate, bark dark. *Leaves* 2–3 in., coriaceous, dark brown when dry, nerves very faint, base acute; petiole ¼–½ in., rather slender. *Spikes* solitary or in pairs; rachis stout, pitted by the flowers; bracteole small, orbicular. *Ovary* oblate; calyx-limb dilated. *Corolla* orange-red, segments linear; buds straight, slightly swollen at the base. *Style* stout, stigma capitate. *Fruit* small, globose, crowned with the cupular calyx.

13. **L. Wightii,** *Hook. f.*; young leaves and flowers mealy or puberulous, leaves opposite and alternate small petioled elliptic obtuse, spikes rather shorter than the leaves strict erect, flowers ⅙ in. 4-merous, buds terete base not swollen, calyx-limb entire, ovary globose. L. Arnottianus, *Wight mss.* (*not of Korthals*).

Deccan Peninsula; at Courtallam, *Wight*.

A small shrub; branches rather slender, terete, pale, bark rough. *Leaves* 1–1½ in., dark when dry, coriaceous, base acute; nerves slender, lower 2–3 pair nearly parallel to the margin; petiole ⅛–¼ in., rather slender. *Spikes* solitary or in pairs; rachis stout; bracteole orbicular and ovary and corolla clothed with a mealy scurf. *Corolla-tube* straight, base not inflated; segments long, connate, linear-spathulate. *Style* slender, lengthening after flowering, stigma capitate.

*** *Spikes or racemes with* 1–2 *pairs of flowers.*

14. **L. ligustrinus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 219, and *Cat.* 516; young parts and flowers rusty-pubescent, leaves opposite and alternate petioled lanceolate obtuse or acute penninerved, racemes axillary very short with 1–2 pairs of flowers, flowers ⅓ in. 4-merous, buds subterete base swollen 4-angled, calyx-limb entire. *DC. Prodr.* iv. 294; *Don Prodr.* 143; *Brand. For. Fl.* 395.

Tropical Himalaya, from Kumaon to Sikkim, alt. 2–4000 ft. Chittagong, *J. D. H. & T. T.*

Apparently terrestrial (Brandis), a root parasite? *Branches* stout, terete, closely lenticellate, bark pale. *Leaves* 1½–2½ in., brown or black when dry, very coriaceous, nerves obscure, base acute; petiole ⅛–¼ in. *Racemes* single or in pairs, spreading, ½–1 in. long; rachis rigid, glabrous; flowers very shortly pedicelled; bracteole rather large, orbicular. *Ovary* urceolate; calyx-limb short. *Corolla-segments* reflexed from the middle, pink or scarlet, linear; bud straight, obtuse. *Style* slender, stigma capitate.—The parasitism of this and the following should be examined.

15. **L. terrestris,** *Hook. f.*; quite glabrous, leaves opposite and alternate petioled lanceolate obtuse or acute penninerved, racemes axillary short or long with 1–2 pairs of flowers, flowers ⅓ in. 4-merous, buds sub-

terete base swollen 4-angled, calyx-limb entire. L. ligustrinus, *Herb. Ind. Or. H. f. & T. in part.*

KHASIA MTS., alt. 1–3000 ft. *J. D. H. & T. T.*

Very similar to *L. ligustrinus*, and always growing from the ground, and hence probably a root parasite, quite glabrous, leaves thinner with more distinct nerves, racemes sometimes 2 in. long.—Dr. Thomson and I gathered this plant at seven or eight places at various localities all over the Khasia Mts., and never found it attached to an aerial tree-branch. It either replaces *L. ligustrinus* or is a remarkable form of that plant. I find no traces of ferruginous pubescence on it.

SECT. III. **Heteranthus.** *Flowers* 1–1½ in., axillary, cymose or racemose; bract scale-like; bracteoles 0. *Petals* 4–6, free; buds straight or incurved, tip not clavate. *Anthers* very slender, continuous with the filament, 2-celled.

16. **L. heteranthus,** *Wall. Cat.* 537; very robust, nearly glabrous, leaves alternate shortly petioled elliptic or oblong-lanceolate or linear obtuse or subacute thickly coriaceous penninerved and striolate, racemes longer than the leaves very stout curved sparse-fld., pedicels very stout, ovary cylindric, buds 1–1½ in. curved slender acute, petals 6. *DC. Prodr.* v. 306. L. eleutheropetalus, *Kurz in Journ. As. Soc.* 1871, ii. 64, and *For. Flor.* ii. 321. Dendrophthoe macrocalyx, *Miq. Fl. Ind. Bat.* i. pt. 1, 821.

BURMA; Martaban, *Wallich, Brandis.*—DISTRIB. Java, Borneo.

Branches terete; bark smooth, dark. *Leaves* 3–5 in., very variable in breadth, pale yellow-brown when dry, nerves very obscure, base acute, narrowed into the very stout petiole ¼–½ in. *Racemes* solitary or in pairs, 3–5 in., rachis and pedicels very stout; bract orbicular, concave. *Calyx* ¼ in. narrow, limb cupular entire. *Corolla-buds* slender, linear, red; segments very slender. *Anthers* twice as long as the filament. *Style* filiform, stigma simple.—Kurz describes the flowers as at first minutely puberulous.

SECT. IV. **Cichlanthus.** *Flowers* in axillary fascicles, rarely racemose, usually scurfily or mealy-tomentose; bract scale-like; bracteoles 0. *Calyx* hardly produced above the ovary. *Corolla* long, curved, scurfy, 4-rarely 5-lobed, and deeply cleft behind. *Anthers* narrow, cells indistinct. *Fruit* clavate turbinate or pyriform, except *L. vestitus.*

* *Leaves mealy or scurfy on both surfaces, rarely glabrescent. Fruit pyriform or clavate.*

17. **L. scurrula,** *Linn.*;—*Kurz For. Fl.* ii. 319; young shoots and inflorescence covered with short soft white or rusty tomentum, leaves opposite petioled or sessile ovate elliptic oblong cordate or obovate obtuse or subacute penninerved glabrous or tomentose beneath, flowers in axillary very short subracemose fascicles pedicelled, ovary pyriform, corolla 1 in. very slender usually curved terete, tube split, lobes 4 short, buds terete, tip subclavate acute or obtuse, berry pyriform tomentose.

Throughout INDIA; from the Sikkim Himalaya and Bengal southwards to Singapore; and from Behar, Central India and the Concan, southwards to Travancore and CEYLON.

A large bush, very variable in amount of pubescence, form and size of leaves, and in inflorescence; bark smooth or lenticellate, usually pale. *Leaves* rarely exceeding 3 in., coriaceous; nerves slender; petiole rarely ¾ in. *Inflorescence* if racemose rarely ½ in. long; pedicels long or short. *Ovary* with the base often lengthening into a pedicel as the fruit ripens; calyx-limb very short, entire. *Corolla* variable in length, ½–1 in., very slender, buff or pink, lobes acute. *Filaments* short. *Style* filiform, sometimes obscurely jointed a little way below the tip (opposite the base of the corolla-lobes), stigma minute. *Fruit* ¼ in.—I am in doubt as to whether all the following varieties are really referable to one species, and whether, if so, some others should not be included under it. Kurz, who was the first to bring *L. obtectus* and *grandiflorus* under *L. Scurrula*, confines the type plant to a form with solitary or twin flowers; but this is obviously an abnormal condition, and his *Scurrula proper* does not appear to be distinguishable from his var. *buddleioides*, which I take to be the common and typical form of the species. I have refrained from quoting any Malayan Archipelago species as synonymous, but I suspect that several of these, as *L. obovatus*, *L. sphenoideus*, and *L. repandus*, all of Blume, are referable to *L. Scurrula*.

L. Scurrula proper; leaves petioled from oblong to obovate and rounded or cordate obtuse young clothed on both surfaces and old beneath with pale appressed tomentum, flowers fascicled rusty or grey. L. Scurrula, *DC. Prodr.* iv. 301; *Roxb. Cor. Pl.* ii. t. 140; *Fl. Ind.* i. 550 and ii. 186, and *Ed. Carey & Wall.* ii. 206; *Wall. Cat.* 6867 (*specimens very bad, perhaps a mixture*). L. buddleioides, *Desrouss. in Lamk. Encycl.* iii. 600; *DC. l. c.* 302; *Wight & Arn. Prodr.* 383; *Dalz. & Gibs. Bomb. Fl.* 110. L. Heyneanus, *Wall. Cat.* 528. L. Heynii, *DC. l. c.* 300. L. pyrifolius, *Wall. Cat.* 6869. L. cinnamomeus, *Wall. Cat.* 527; *DC. l. c.* 300.—Loranth No. 19, *Herb. Ind. Or. H. f. & T.*—Sikkim Himalaya, alt. 3–6000 ft., *J. D. H.*, *Clarke.* Assam, Silhet and the Khasia Mts., alt. 3–6000 ft., *Wallich*, *Griffith* (*Kew Distrib.* 2728). Tenasserim, *Helfer* (*Kew Distrib.* 2728). Malacca, *Griffith.* Deccan Peninsula, from the Ganges to Travancore, abundant. Ceylon, ascending to 4000 ft.

Var. *bengalensis*; leaves sessile or subsessile ovate glabrous when mature, flowers fascicled rustily tomentose, corolla ½–⅔ in. curved less slender pale buff. Loranth. No. 23, *Herb. Ind. Or. H. f. & T.*—Assam, Khasia Mts. and Silhet, *Griffith* (*Kew Distrib.* 2722, 2734), *J. D. H. & T. T.* Dacca, *Clarke.* Noakoly, *J. D. H. & T. T.*

Var. *obtecta*, Kurz For. Fl. ii. 319; leaves shortly petioled glabrous when mature, petiole very short, flowers racemose scurfily and rustily tomentose ⅓ in. long, corolla very slender. L. obtectus, *Wall. Cat.* 534. L. concavifolius, *Griff. Notul.* iv. 615.—Ava, *Wallich.* Malacca, *Griffith.*

Var. *lævigata*; like var. *obtecta*, but petiole longer, and flowers less scurfily tomentose. L. rufidulus & lævigatus, *Wall. Cat.* 535, 536; *DC. l. c.* 302.—Tenasserim, *Wallich*, *Helfer* (*Kew Distrib.* 2715, 2731). Malacca, *Griffith.*—Very near var. *graciliflora*.

Var. *graciliflora*, Kurz l. c. 319; leaves elliptic adult glabrous, petiole ¼ in., flowers ½–1 in. in short racemes very slender much curved hoary with pale or dark pubescence. L. graciliflorus, *Wall. Cat.* 521; *DC. l. c.* 300. L. obovatus, *Blume Bijd.* 663, and *Fl. Jav. Loranth.* t. 9. Dendrophthoe obovata, *Miquel Fl. Ind. Bat.* i. 1. 817.—Sikkim, alt. 2000 ft., *J. D. H.* Bhotan, *Griffith.* Assam and Silhet, *Wallich*, *Griffith* (*Kew Distrib.* 2714). Chittagong, *J. D. H. & T. T.* Also Timor.

18. **L. cordifolius,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 223, and *Cat.* 517; branches and leaves on both surfaces (except in age) clothed with white or tawny appressed tomentum, leaves opposite usually large rather long-petioled orbicular or very broadly ovate base rounded or cordate, tip obtuse or rounded, flowers ¾–1 in. fascicled on a short peduncle pedicelled densely rufous or white-tomentose, tip of bud very acute, ovary pyriform, corolla slender curved terete, tube split, lobes 4 short acute, berry pyriform tomentose. *DC. Prodr.* iv. 302; *Don Prodr.* 143; *Brand. For. Fl.* 396. L. buddleioides, *Thwaites Enum. in part*, 136.

SUBTROPICAL HIMALAYA, alt. 1–5000 ft.; from Kashmir, *Brandis*, and Garwhal, *Falconer*, to Nepal, *Wallich.* CENTRAL INDIA, at Hazaribagh, *Vicary.* NILGHIRI HILLS, *Wight*, at Goodaloor, alt. 4000 ft., *Clarke.* CEYLON, *Thwaites.*

This is hardly more than a variety of *L. Scurrula*, differing in its greater size, more rounded and cordate leaves and the copious white tomentum, which gives it a very different aspect from the ordinary state of *L. scurrula*, of which Wight and Arnott indeed suggest its being a variety. The Ceylon specimens are beautifully white.

19. **L. ferrugineus,** *Roxb. Fl. Ind.* i. 551, ii. 188 (*ferruginosus*), and *Ed. Carey & Wall.* ii. 207; branchlets and leaves beneath clothed with close rusty scurfy tomentum, leaves opposite shortly petioled elliptic obtuse glabrous above base rounded, flowers ½–1 in. in axillary sessile or shortly peduncled fascicles pedicelled densely rusty villous, calyx turbinate, limb entire, corolla slender terete, tube split, lobes 4, fruit pyriform villous. *DC. Prodr.* iv. 299; *Wall. Cat.* 500; *Jack in Mal. Misc.* i. 9, and in *Hook. Bot. Misc.* i. 279, t. 59. L. Schultesii, *Blume in DC. l. c.* 300, and *Fl. Jav. Loranth.* t. 2. L. Oortianus, *Korth, fid. Herb. Hort. Calcutt.* Dendrophthoe ferruginea, *G. Don Gen. Syst.* iii. 420; *Miquel Fl. Ind. Bat.* i. 1. 812. D. Oortiana, *Miquel l. c.* 813.

PENANG and SINGAPORE, *Roxburgh, Wallich, Phillips,* &c. MALACCA, *Griffith* (*Kew Distrib.* 2727), *Maingay* (*Kew Distrib.* 686).—DISTRIB. Java, Sumatra.

Branches terete; bark smooth, dark or grey, minutely lenticellate. *Leaves* 1½–4 in., very uniform in shape, coriaceous, dark brown or black above when dry, nerves faint; petiole ⅛–⅙ in., villous. *Fascicles of flowers* solitary or clustered, very variable in length, differing from all states of *L. scurrula* in the thick tomentum and less pyriform ovary. *Corolla* when fresh green within, rufous externally.

20. **L. rhopalocarpus,** *Kurz in Journ. As. Soc.* 1871, ii. 62, and *For. Fl.* ii. 319; branches slender and branchlets leaves beneath and inflorescence scurfily tomentose, leaves small opposite and alternate shortly petioled obovate or cuneate glabrate above, flowers in axillary sessile or shortly peduncled fascicles pedicelled tawny scurfily tomentose, calyx oblong, limb truncate, corolla ¾ in., tube very slender terete curved split 4-lobed, fruit elongate narrowly clavate-truncate, base with a thickened ring. L. cuneatus, *Wall. Cat.* 541; *DC. Prodr.* iv. 301, *excl. syn.* ? L. fuscus, *Blume Bijd.* 660, and *Fl. Jav. Loranth.* 28, t. 7. Dendrophthoe fusca, *Miquel Fl. Ind. Bat.* i. 1. 814.

PEGU and ARRACAN, *Kurz.* MARTABAN, *Wallich*; at Moulmein, *Griffith* (*Kew Distrib.* 2732).—DISTRIB. Java ?

A small shrub, ½–2 ft.; branches terete; bark dark, minutely lenticellate, of shoots rufous. *Leaves* 1–2 in., young tawny on both surfaces old glabrous on both, base narrowed into the very short petiole, tip rounded, nerves few ascending. *Flowers* few, "whitish, ½–¾ in., somewhat lepidote;" bract minute. *Fruit* ½–¾ in. long, gradually narrowed from the truncate tip to the base, which has an annular thickening immediately above the bract, terete, scurfy.—The very remarkable fruit at once distinguishes this species, of which I have seen no corolla.

21. **L. malaccensis,** *Hook. f.*; branches slender, branchlets and inflorescence rusty and scurfily pubescent, leaves small opposite on slender petioles elliptic obtuse quite glabrous, flowers ½ in., in axillary fascicles of 2 or more very shortly pedicelled, calyx-tube pyriform, limb truncate contracted, corolla-tube very slender terete split in front, lobes 4 acute, fruit subcapitately clavate contracted into a very slender pedicel.

MALACCA, *Griffith.*

Apparently a small shrub; branches terete, closely lenticellate. *Leaves* 1½ in., thinly coriaceous, very dark brown when dry, almost shining above, nerves faint spreading; petiole ⅛–⅙ in., very slender for the genus. *Flowers* dark rusty brown when dry; bract minute. *Corolla-lobes* very short, acute. *Fruit* as long as the corolla, consisting of a short ellipsoid head suddenly contracted into a long slender pedicel which is not thickened at the base, scurfily pubescent.—The fruit of this also is very characteristic. The only specimens I have seen are Griffith's, and they were communicated to Dr. Gardner in Ceylon.

22. **L. thelocarpus,** *Hook. f.*; branchlets and leaves beneath clothed with very fine cinnamon or tawny scurfy stellate tomentum, leaves opposite petioled oblong or ovate-oblong obtuse glabrous above, flowers fascicled on short axillary peduncles pedicelled, fruit clavate papillose contracted into a podicel with an annular thickened base. Loranthus No. 6, *Herb. Ind. Or. H.f. & T.*

CHITTAGONG; at Kazi ke hat, *J. D. H. & T. T.*

Branches stout, terete, sparsely lenticellate, bark grey. *Leaves* 1½–3 in., rigidly coriaceous, dark brown and opaque above, nerves most obscure, base rounded; petiole ¼–⅓ in. *Flowers* not seen; bracts very minute. *Fruit* ½ in. long, subumbellate, inserted on pedicels half their length, puberulous and bearing naked orbicular pustule-like tubercles, tip rounded.—A peculiar species, not easily distinguished by words from *L. scurrula*, except by the very different fruit, which bears papillæ something like a *Boerhavia*; the leaves also are much more rigid than *L. scurrula.*

23. **L. pulverulentus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* 221, and *Cat.* 515; branchlets and young leaves clothed with flocculent white fugacious mealy tomentum, leaves often large opposite long-petioled broadly ovate or ovate-oblong glabrous acute or obtuse, nerves distinct, flowers 1 in. in solitary or fascicled racemes long-pedicelled scurfily white-tomentose, calyx-limb 0, corolla slender curved, tube terete split, lobes 4 narrow, fruit clavate mealy. *DC. Prodr.* iv. 301; *Brand. For. Fl.* 396; *Kurz For. Fl.* ii. 318. L. carnosus, *Wall. Cat.* 552. L. leptanthus, *Wall. Cat.* 553 (*excl.* B.).

SUBTROPICAL HIMALAYA, alt. 2–4000 ft., from Garwhal to Bhotan. PEGU and AVA, *Kurz.* CENTRAL PROVINCES, *Brandis.* The CONCAN, *Stocks.*

Branches robust, terete, usually closely lenticellate; bark dark grey. *Leaves* very variable in size, 2–8 in. (much smaller in var. *leptanthus*), dark brown when dry; nerves arching, much stronger than in its allies; petiole ⅓–1 in. *Racemes* ½–2½ in.; pedicels ¼–⅓ in.; bract minute; *flowers* green when fresh, white or cream-coloured when dry. *Ovary* pyriform, top contracted. *Style* very slender, stigma minute ovoid. *Fruit* "large, club-shaped," *Kurz.*

Var. *leptanthus*; leaves smaller 1–2 in. elliptic or orbicular very coriaceous nerves obscure, corolla 1½ in. L. leptanthus, *DC. l. c.* 299. L. leptanthus, *Wall.*, β. rotundifolia, *Cat.* 533 B.—Ava, *Wallich.*

** *Leaves glabrous or nearly so. Fruit turbinate.*

24. **L. umbellifer,** *Schultz Syst.* vii. 97; youngest parts rusty-pubescent, leaves opposite and alternate petioled oblong obtuse or acute, glabrous, flowers 1–1½ in. umbelled or fascicled rarely subracemose on short axillary peduncles young hoary, corolla-tube slender curved, lobes 4 short, fruit turbinate. *DC. Prodr.* iv. 301. L. umbellatus, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 222, and *Cat.* 516; *Don Prodr.* 143.—Loranth. No. 72, *Herb. Ind. Or. H.f. & T.*

TEMPERATE and SUBTROPICAL HIMALAYA, from Nepal to Bhotan, alt. 2–5000 ft., *Wallich,* &c. KHASIA MTS., alt. 4–6000 ft., common.

Branches rather stout, grey, lenticellate. *Leaves* 3–4 in., subacute at both ends, coriaceous, nerves distinct, brownish when dry; petiole ¼–⅓ in. *Inflorescence* variable, flowers sometimes fascicled on the branches without a common peduncle, at others subracemose, but with the raceme never more than ⅓ in.; bract small. *Calyx-tube* minute, ovoid or obovoid, rusty-pubescent; limb very short, obscurely 4-toothed. *Corolla* exceedingly slender in bud, with a clavate obtuse or subacute tip;

tube slightly swollen in flower; lobes not ¼ the length of the tube. *Filaments* shorter than the anther. *Stigma* capitate. *Fruit* ⅓ in., turbinately obovate with a broad subtruncate top.—Brandis says there is no bract, but small bracteoles at the base of the ovary. I think this is a mistake.

Var. *clavigera*; flowers perfectly glabrous. L. clavigerus, *Wall. Cat.* 6873. ? L. clavatus, *Roxb. Fl. Ind.* i. 553, ii. 189, and *Ed. Carey & Wall.* ii. 210. L. Corynitis, *Spreng. Cur. Post.* 140; *DC. l. c.* 317.—Silhet, *De Silva & Gomez.*—Wallich's specimens are the only ones I have seen.

25. **L. elatus,** *Edgew. in Trans. Linn. Soc.* xx. 58; youngest buds rusty-pubescent, leaves opposite and alternate large long-petioled broadly ovate base rounded or subcordate glabrous, flowers 1–1½ in. umbelled or fascicled on short axillary peduncles rarely subracemose young hoary, corolla-tube narrow curved split, lobes short linear-spathulate, fruit turbinate. L. umbellifer, *Brand. For. Fl.* 397.

TEMPERATE HIMALAYA, alt. 5–10,000 ft.; from Simla, *Royle, Edgeworth,* &c., to Bhotan, *Griffith.*

Very near indeed to *L. umbellifer*, but the bark is almost black when dry, the leaves much larger, more coriaceous, of a very different shape and long-petioled, the calyx broader and more truncate, and the tube of the corolla is much less slender in bud; it is further remarkable for the elevation it inhabits.

*** *Leaves tomentose. Fruit ellipsoid.*

26. **L. vestitus,** *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 218, and *Cat.* 511; branchlets petioles and leaves beneath clothed with soft appressed buff or pale rufous tomentum, leaves opposite petioled oblong or ovate- or linear-oblong obtuse glabrous above base acute, flowers ⅓–¾ in. in axillary sessile or peduncled fascicles pedicelled rufous-villous, calyx-limb truncate, corolla terete, buds with rounded clavate tips, tube split, lobes 4 obtuse, fruit ellipsoid at length glabrous. *DC. Prodr.* iv. 302; *Don Prodr.* 143; *Brand. For. Fl.* 396; *Gamble Man. Ind. Timb.* 320.

SUBTROPICAL and WESTERN HIMALAYA, alt. 5–7000 ft., from Garwhal to Nepal. KHASIA MTS., alt. 4–6000 ft., *Griffith, J. D. H. & T. T.*

A large shrub (erect on oak trees in the Khasia Mts.); branches stout, terete; bark dark, sparsely lenticellate. *Leaves* 2½–4 in., very coriaceous, often bullate, and with recurved margins, pale greenish and shining above, nerves faint; petiole ¼–½ in. *Fascicles of flowers* solitary or clustered, usually peduncled; flowers smaller than in *L. ferrugineus.* *Corolla-lobes* very short, obtuse. *Fruit* ⅓–½ in. long.—A very distinct species, differing in its fruit from the others of this section.

SECT. V. **Dendrophthoe.** *Flowers* in axillary clusters or racemes, often mealy; bract scale-like; bracteoles 0. *Calyx* usually produced into a toothed tube above the ovary. *Corolla* long or short, tube often gibbously inflated, straight or incurved, usually split at the back, 5- rarely 4-lobed. *Anthers* narrow, cells indistinct. *Fruit* ovoid or oblong (pyriform in *L. Stocksii*).

* *Flowers pubescent tomentose or villous.*

27. **L. tomentosus,** *Heyne in Roth Nov. Sp.* 191; branches and leaves beneath rusty-tomentose, leaves all alternate petioled oblong or obovate-oblong obtuse penninerved, bract rarely exceeding the 5-toothed calyx, flowers ¾ in. in axillary sessile or shortly peduncled fascicles pedicelled densely rusty-villous with hispid hairs, corolla curved, tube terete split, lobes 5 oblong. L. bracteatus, *DC. Prodr.* iv. 306, *in part.* L. tomentosus,

var. lanuginosus, *Thwaites' Enum.* 135. L. Candolleanus, *Hohenack. Pl. Ind. Or.* No. 514 a.—Loranth. No. 9, *Herb. Ind. Or. H.f. & T.*

NILGHIRI and PULNEY MTS., *Heyne, Wight, Schmidt*, &c. CEYLON, alt. 3–5000 ft. *Thwaites* (C. P. 2492).

Branches stout, dark grey, terete. *Leaves* 1–1½ in., tip rounded, rarely 3-nerved at the base, glabrous, black and opaque above when dry; petiole ⅓–¼ in. *Fascicles* few-fld., solitary or clustered, peduncle rarely ⅛ in. *Ovary* short. *Corolla-tube* terete, curved, split to the middle, not inflated or gibbous. *Filaments* short, anthers oblong. *Style* filiform, stigma capitellate.—I have regarded this as Heyne's *tomentosus*, in contradistinction to his *bracteatus*, agreeing as it does with Roth's character, except in that the pubescence is rusty red and not grey. Roth describes the bract as only 2 lines long, whereas in Heyne's *bracteatus* it reaches ½ in.: this is, however, a very variable organ in both species. Thwaites' var. *normalis* (C. P. 1642) is very unlike the normal peninsular forms; it has elliptic-oblong green leaves 3–3½ in. long, with subsilky pubescence beneath, dense clusters of sessile flowers, and less villous flowers.

28. **L. bracteatus,** *Heyne in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 220; branches inflorescence and young leaves beneath clothed with thin soft grey or buff tomentum, leaves all alternate petioled orbicular or cuneate-obovate penninerved, bract (sometimes 2) much longer than the 5-toothed calyx, flowers ⅔–1 in. in axillary peduncled fascicles pedicelled, corolla curved, tube gibbously inflated in the middle, lobes 5 linear. *DC. Prodr.* iv. 306. (*excl. syn. tomentosus*); *Wall. Cat.* 510; *Wight & Arn. Prodr.* 385 (*excl. syn. Roth, &c.*). L. tomentosus, *Wight Ic.* t. 378. L. Heyneanus, *Schult. Syst.* 106.

SOUTH DECCAN PENINSULA; on the Nilghiris, &c., *Heyne*, &c.

Rootstock creeping, branches slender. *Leaves* ½–1 in., grey when dry, rarely cuneately obovate, glabrous or grey-pubescent or tomentose; petiole slender, ⅛–¼ in. *Bracts* oblong, often 3 times as long as the 5-toothed calyx. *Flowers* much longer than in *L. tomentosus*, not villous, more appressedly grey-pubescent, tube more slender though gibbously swollen in the middle; lobes very narrow. *Fruit* ½ in., elliptic-oblong, puberulous.

Var. *angustifolia*; clothed with thin ashy tomentum, leaves narrowly obovate-cuneate, bracts very narrow, flowers smaller. L. montanus, *var.* longifolius, *Wight in Wall. Herb.* (6886 in part).—Pulney Mts., *Wight.*—Though very dissimilar in foliage, I find no character whereby to distinguish this specifically.

29. **L. Stocksii,** *Hook. f.*; leaves small opposite clothed with buff mealy pubescence sessile or subsessile oblong or orbicular rounded at both ends or base cordate, flowers solitary axillary sessile, bracts as long as the calyx oblong obtuse, fruit small pyriform tomentose. Loranth. No. 15, *Herb. Ind. Or. H.f. & T.*

The CONCAN, *Stocks.*

Branches slender, bark grey, not lenticellate, young mealy like the foliage. *Leaves* ½–1 in., mealy on both surfaces; nerves few, obscure. *Fruit* (young) ¼–⅓ in. long; tip rounded; calyx-limb not produced, truncate.—Apparently a very distinct species near *L. bracteatus*, but with sessile leaves and pyriform fruit like that of a *Cyclanthus*, to which section perhaps it should be referred.

30. **L. recurvus,** *Wall. in DC. Prodr.* iv. 299, and *Cat.* 525; branchlets and young leaves clothed with buff or grey pubescence, leaves all alternate obovate-cuneate glabrous or ashy-pubescent beneath, 3-nerved at the base, bract shorter than the 5-toothed calyx, flowers ⅔ in. in numerous axillary sessile tomentose fascicles pedicelled, corolla usually strongly curved, tube split gibbously inflated below the middle, lobes 5 linear-oblong. *Wight*

& Arn. Prodr. 383. L. Candolleanus, *Wight & Arn. l. c.* 385; *Wight Ic.* t. 305.

NILGHIRI MTS., *Noton*, *Wight*, &c.

Branches usually very stout, sparsely lenticellate; bark black. *Leaves* ¾–2 in., usually very coriaceous, dark and opaque above, nerves few; petiole ⅛–¼ in. *Fascicles* usually many and dense-fld.; flowers very shortly pedicelled; corolla stouter than in *L. bracteatus*, often curved in a semicircle, but sometimes straight.

** *Flowers at length glabrous.*

31. **L. cuneatus,** *Heyne in Roth Nov. Sp.* 193; glabrous except the youngest buds, leaves small all alternate petioled obovate-cuneate tip rounded or retuse base 3-nerved, bract small acute much shorter than the 5-toothed calyx, flowers ¾–1¼ in. in subsessile axillary fascicles pedicelled, corolla-tube split slightly gibbously inflated above the middle, lobes 5 linear, fruit oblong. *Wight & Arn. Prodr.* 385; *Thwaites Enum.* 135 (*excl. var.* β.). L. lobeliæflorus, *DC. Prodr.* iv. 406. L. goodeniæflorus, *DC. l. c.*; *Wight & Arn. l. c.* L. montanus, *Wight in Wall. Cat.* 6866.

DECCAN PENINSULA; from the Concan southwards. CEYLON, abundant.

Branches not robust, bark grey. *Leaves* ½–1½ in., very variable in width, narrowed into the short petiole, nerves few. *Fascicles of flowers* rarely peduncled; flowers very variable in size, shortly pedicelled. *Calyx* hoary. *Corolla* very slender, straight or curved. *Fruit* ⅓ in., oblong, surmounted by the cupular toothed calyx.—I have seen no authentic specimens of *L. goodeniæflorus* and *lobeliæflorus*.

32. **L. sclerophyllus,** *Thwaites Enum.* 135; glabrous except the flower and leaf-buds, leaves all alternate very shortly petioled very coriaceous obovate or cuneate-obovate 3-nerved, bract shorter than the 5-toothed calyx, flowers 1 in. in axillary sessile or very shortly peduncled fascicles pedicelled, corolla-tube nearly straight split slightly swollen about the middle, lobes 5 linear, fruit oblong glabrous.

CEYLON; Central Province, ascending to 7000 ft., *Walker*, &c.

Very much more robust than *L. cuneatus*, with much larger broader thickly coriaceous leaves 1½–2 in. long. *Calyx* pubescent.

33. ? **L. ligulatus,** *Thwaites Enum.* 135; leaves petioled glabrous linear or oblong base acute tip rounded nerveless, racemes glabrous few-fld. equalling or shorter than the leaves, bract minute, flowers 1 in., calyx obscurely toothed, corolla glabrous, lobes 5 linear-spathulate acute.

CEYLON; at Jaffna and Calpentyne, *Gardner*.

Branches terete. *Leaves* ¾–2 in.; petiole 1/12–⅛ in.—I have nothing to add to the above meagre description taken from Thwaites, the specimens I have seen being very imperfect.

34. **L. suborbicularis,** *Thwaites Enum.* 134; young shoots and flower-buds scurfily pubescent, leaves all alternate petioled very coriaceous orbicular or orbicular-obovate 3-nerved, bract smaller than the sharply 5-toothed pubescent calyx, flowers 1 in. racemose, corolla straight or curved, tube split gibbously inflated below the middle, lobes 5 linear, fruit oblong glabrous.

CEYLON; in elevated parts of the Island, *Walker*, &c.

Habit of *L. sclerophyllus*, but leaves more rounded, petiole longer, sometimes ¼ in. long, and flowers in racemes ½–1 in. long.

35. **L. longiflorus,** *Desrouss. in Lamk. Encycl.* iii. 498; quite glabrous

throughout (racemes rarely puberulous), leaves alternate or opposite sessile or petioled orbicular oblong elliptic or linear obtuse thickly coriaceous, flowers 1–2½ in. in axillary and supra-axillary racemes secund erect pedicelled, calyx-limb cupular truncate entire, corolla slender curved split slightly dilated above the middle, lobes 5 short linear-oblong, fruit oblong. *DC. Prodr.* iv. 304; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wight & Arn. Prodr.* 384; *Roxb. Cor. Pl.* t. 139; *Grah. Cat. Bomb. Pl.* 86; *Dalz. & Gibs. Bomb. Fl.* 110; *Brandis For. Fl.* 397; *Kurz For. Fl.* 321; *Thwaites Enum.* 134; *Wall. Cat.* 507; *Wight Ic.* t. 302; *Gamble Man. Ind. Timb.* 320. L. bicolor, *Roxb. Fl. Ind.* i. 548, ii. 185, and *Ed. Carey & Wall.* ii. 205, and *Cor. Pl.* t. 139; *Wall. Cat.* 499. L. Kœnigianus, *Agardh in Schult. Syst.* vii. 108; *DC. l. c.* 307. L. Wightianus, *Wall. Cat.* 6872. L. imbricatus and L. lineatus, *Edgew. in Trans. Linn Soc.* xx. 59.—*Rheede Hort. Mal.* x. t. 4.

TROPICAL and TEMPERATE HIMALAYA, alt. 3–7500 ft., from Jamu to Bhotan. GANGETIC PLAINS, from Oude eastward to ASSAM, and southward on plains and hills throughout both Peninsulas to TRAVANCORE and MALACCA. CEYLON, in the warm parts of the Island.

A large bush; branches terete, usually smooth, dark or light grey, lenticellate or not. *Leaves* 3–10 by ½–5 in., infinitely variable in shape and veining, opaque and dark brown when dry; petiole stout, ¼–½ in. *Racemes* 1–4 in., solitary or fascicled, stout or slender, usually upcurved with upcurving flowers of variable length; bract orbicular, cupular; pedicels stout or slender. *Calyx* hoary in Ceylon specimens, limb quite entire. *Corolla* pink or red, with often green lobes, lower half of tube very narrow, reflexed part of the lobes ⅓–¼ the length of the tube. *Filaments* shorter than the anthers, often glandular. *Stigma* capitate. *Fruit* ½ in., smooth, crowned with the cupular calyx.—Of the many forms of this common and variable plant the following are the most remarkable.

Var. *falcata*, Kurz For. Fl. ii. 321; leaves linear 4–6 by ¼–½ in. often falcate, flowers ¾–1 in., calyx glabrous or white and scurfy. L. falcatus, *Linn. f. Suppl.* 211; *DC. l. c.* 305; *Wall. Cat.* 519. L. Wightianus, *Wall. Cat.* 6872, in part. L. longiflorus γ., *Wight & Arn. l. c.*—Deccan Peninsula and Ceylon.—The name of this variety is much the earliest for the species, but is very inapplicable, and has hence been put aside by general consent.

Var. *amplexifolia*, Thwaites Enum. 134; leaves large sessile 4–7 in. diam. orbicular- or oblong-cordate amplexicaul. L. amplexifolius, *DC. l. c.*; *Wight & Arn. l. c.*; *Grah. Cat. Bomb. Pl.* 86. L. amplexicaulis, *Wall. Cat.* 520.—Deccan Peninsula and Ceylon.—Inflorescence often terminal.

Var. *pubescens*; peduncle pedicels calyx and corolla in bud pubescent.—Deccan Peninsula.

36. **L. lonchiphyllus,** *Thwaites Enum.* 418; very robust, quite glabrous, leaves opposite and alternate subsessile very coriaceous ovate acute or acuminate strongly penninerved bullate, bract minute, flowers 1½ in. in shortly peduncled fascicles pedicelled, calyx-limb entire, corolla-tube very slender below gibbously inflated above the middle split nearly to the base, lobes 5 linear much shorter than the tube, fruit ovoid.

CEYLON; in the Ambagamowa District, *Thwaites.*

Branches very thick, terete, bark pale smooth or lenticellate. *Leaves* 4–6 by 1½–2½ in., pale brown when dry, margin recurved, base rounded or subcordate, nerves many arching deeply sunk and anastomosing; petiole ⅛–¼ in., very stout. *Flowers* few in a fascicle. *Calyx* small, bract subacute. *Corolla* slightly curved. *Style* slender, stigma capitate. *Fruit* ½ in. long.—The strongly nerved and bullate leaves of the only specimen I have seen are marked characters.

37. **L. elegans,** *Wall. in DC. Prodr.* iv. 304, and *Cat.* 530; very robust, glabrous, leaves opposite and alternate very shortly petioled elliptic

or narrow-oblong obtuse very thickly coriaceous, flowers 1–1¾ in. in very short axillary racemes stoutly pedicelled, bract cupular, ovary oblong, calyx-limb cupular obscurely 5-toothed, corolla slender curved, tube split dilated above the middle, lobes 5 linear one-fourth the length of the tube.

BURMA; on the Irawaddy near Yenangeun, *Wallich.*

Branches terete, smooth, bark grey. *Leaves* 2½–3 in., narrowed into the petiole, dark brown and opaque when dry, with undulate margins; nerves few, faint, very oblique. *Racemes* ⅓–⅔ in., robust, 4–6-fld., peduncle pedicels and calyx hoary; corolla glabrous, scarlet?—I have seen only Wallich's insufficient specimens; it is possibly a form of *L. longiflorus.* A somewhat similar plant from Pegu (*M'Lelland*) has broader leaves, with smaller flowers and quite glabrous racemes.

38. **L. elasticus,** *Desrouss. in Lamk. Encycl.* iii. 599; quite glabrous, leaves all opposite sessile very thickly coriaceous from orbicular to elliptic oblong obtuse 3–5-nerved, flowers 1 in. in axillary fascicles sessile, bract minute, calyx-limb cupular entire, corolla-tube funnel-shaped split, lobes 5 filiform spirally coiled much longer than the tube. *DC. Prodr.* iv. 306; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 217; *Wall. Cat.* 508; *Dalz. & Gibs. Bomb. Fl.* 109; *Wight Ic.* t. 343. L. Euphorbiæ, *Wight Ic.* t. 1063.—*Rheede Hort. Mal.* x. t. 3.

DECCAN PENINSULA; Vingorla, &c., in the Concan, *Dalzell, Ritchie*; Malabar, the Nilghiri and Pulney Mts., *Wight.*

Branches dichotomous, stout, terete, smooth, pale brown, lenticels few. *Leaves* very variable, 1½–4 in., pale brown on both surfaces when dry, base acute. *Flowers* quite glabrous and sessile; ovary minute. *Corolla-tube* rather swollen below. *Filaments* very long, spirally coiled like the corolla-lobes; anthers long, as narrow as the filament. *Style* very long, stigma fusiform. *Fruit* ovoid, red, "the size of a small bean," *Wight.*—I do not find any difference between *L. Euphorbiæ* and *elasticus*; the corolla-tube is split in both, though Wight does not observe this in *L. Euphorbiæ*, which has smaller rounder leaves than the type. This is one of the few Indian species with flowers absolutely sessile on the branches.

39. **L. pentandrus,** *Linn. Mant.* 63; leaves rarely opposite petioled elliptic-oblong or -lanceolate rarely obovate obtuse or acute, flowers ¾ in. in densely scurfy axillary very short racemes, bract cupular, calyx-limb 5-toothed, corolla straight, tube dilated below equally 5-cleft to the middle, lobes linear acute, fruit oblong-ovoid. *DC. Prodr.* iv. 305; *Kurz For. Fl.* ii. 320; *Wall. Cat.* 514; *Blume Fl. Jav. Loranth.* 33, t. 10. L. farinosus, *Desr. in Lamk. Encycl.* iii. 597; *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 221; *Wall. Cat.* 514; *Griff. Notul.* iv. 616, and *Ic. Pl. Asiat.* t. 620, f. 1, 2. L. rigidus, contractus, & Finlaysonianus, *Wall. Cat.* 531, 6864, 6871. Dendrophthoe pentandra & farinosa, *Miquel Fl. Ind. Bat.* i. pt. 1, 818, 819. Elytranthe farinosa, *G. Don Gen. Syst.* iv. 427.

SILHET, *Wallich.* CHITTAGONG, *J. D. H. & T. T.* PEGU, *Kurz.* TENASSERIM, *Wallich.* MALACCA, *Griffith* (L. elasticus, *Kew Distrib.* 2728), &c. SINGAPORE, *Lobb.* PENANG, *Wallich, Phillips.*—DISTRIB. Sumatra, Java, Borneo.

Branches rather stout, terete, grey. *Leaves* 2–6 in., dark brown or almost black when dry, thickly coriaceous, nerves faint; petiole ¼–½ in. *Racemes* solitary or fascicled, few- or many-fld.; flowers usually crowded; pedicels short, stout; bract rather large; buds cylindric, not clavate at the tip. *Corolla* not split, reflexed portion of lobes half the length of the tube. *Style* stout, stigma capitate. *Fruit* ⅓ in., crowned by the cupular unequally 5-lobed calyx-limb.

40. **L. neelgherrensis,** *Wight & Arn. Prodr.* 382; very robust, quite glabrous, leaves opposite and alternate thickly coriaceous oblong orbicular elliptic or oblong-lanceolate obtuse penni- or few-nerved, bract minute,

flowers 1 in. in sessile or peduncled axillary fascicles sessile or pedicelled, calyx-limb entire, corolla-tube rather inflated, lobes 5 linear much longer than the tube reflexed above the middle, fruit oblong. *Wight Ic.* t. 1020, and *Spic. Neilgherr.* t. 88; *Thwaites Enum.* 134; *Zenk. Plant. Ind.* t. 17.

NILGHIRI HILLS; ascending to 7000 ft., *Wight*, &c. CEYLON; Central Province, alt. 1–7000 ft., *Walker*, &c.

Branches very stout, terete, smooth, or minutely cracked, not lenticellate. *Leaves* 3–6 in. by 1½–4 in., narrowed into the petiole, dark brown above and beneath; nerves very few, raised on both surfaces; petiole ¼–½ in., very stout. *Flowers* fascicled on the nodes of the axils, sessile and peduncled together; bract variable; pedicels very short or 0. *Calyx* minute, ellipsoid or globose, limb cupular, margin thin hardly lobed. *Corolla-tube* very slender in bud, in flower straight, not split, lobes sometimes all free, at others one or two are combined for half their length. *Filaments* short, anthers long. *Style* filiform, stigma capitate. *Fruit* ½ in., smooth.—The nervation varies much. Thwaites suggests that this may be a variety of *L. elasticus*, but it is very different.

VAR.? *Clarkei*; flowers smaller ¾ in. corolla-lobes equal shorter more spathulate reflexed portion about ⅛ in.—Ootacamund, alt. 7000 ft., *Clarke*.—Amongst the very numerous specimens of *L. neelgherrensis* that I have examined, none have such short and spathulate corolla-lobes as this.

41. **L. memecylifolius,** *Wight & Arn. Prodr.* 383; quite glabrous, leaves opposite and alternate petioled narrowly oblong or elliptic obtuse thickly coriaceous, flowers 1–1½ in. umbelled on short stout axillary peduncles erect pedicelled, ovary cylindric-oblong, calyx-limb cupular obtusely 5-toothed or truncate, corolla straight, tube 5-angled split slightly inflated above the middle, lobes 5 linear-lanceolate acuminate as long as the tube or longer, fruit oblong or pyriform.

NILGHIRI HILLS, alt. 8000 ft., *Wight*, *Schmidt*, &c.

Branches stout, terete, brown. *Leaves* 1–3 in., dark brown and smooth when dry, narrowed into the very short petiole, flat, nerves faint, oblique. *Umbels* solitary or fascicled; peduncle and pedicels very stout, ⅛–⅙ in.; bracts orbicular, very coriaceous. *Ovary* broad at the top, calyx-limb short. *Corolla* scarlet, strict, erect, acute in bud, lobes reflexed for about half their length. *Filaments* much shorter than the anthers. *Stigma* capitate. *Fruit* ⅓ in., smooth, crowned by the cupular calyx-limb.—Closely allied to *L. neelgherrensis*, but the leaves are smaller, flowers umbelled and fewer and larger, corolla not dilated at the base, and the calyx obtusely toothed.

42. **L. sarcophyllus,** *Wall. in Wight & Arn. Prodr.* 384, and *Cat.* 6863; very stout, quite glabrous, leaves large alternate and opposite shortly petioled, elliptic oblong or orbicular very thickly coriaceous obtuse, flowers 1–1⅓ in. in short many-fld. racemes, calyx-limb cupular obtusely unequally lobulate, corolla curved, tube narrow split dilated towards the base, lobes 5 linear slender much longer than the tube. L. carnosus, *Herb. Wight.*

NILGHIRI MTS.; at Cumbum on a Ficus, *Wight*.

Habit of the large-leaved states of *L. longiflorus* with oblique nerves, but leaves much thicker, calyx-limb distinctly lobulate, and corolla-tube dilated below. Wight's specimens are the only ones I have seen.

43. **L. crassus,** *Hook. f.*; very stout, leaves large alternate petioled very thickly coriaceous elliptic or oblong obtuse, flowers ¾ in. in small axillary subsessile racemes densely furfuraceous pedicelled, calyx-limb cupular quite entire, corolla straight funnel-shaped not split, equally cleft to below the middle into 5–6 lobes with long reflexed linear tips, fruit ovoid-oblong. L. retusus, *Wall. Cat.* 504, *in part.*

SINGAPORE, *Wallich.*

Branches terete, grey, densely lenticellate. *Leaves* 3–7 by 1½–4 in., dark brown and opaque when dry on both surfaces; nerves broad, distinct; petiole very stout, ¼ in. *Racemes* ½ in.; pedicels very short; bracts orbicular, cupular. *Calyx-tube* globose, limb truncate. *Corolla-lobes* linear from a cuneate base, reflexed for half their length. *Anthers* linear, longer than the filament. *Stigma* capitate. *Fruit* (young) ½ in. long, crowned with the cupular calyx-limb.—I have seen only Wallich's specimens of this very fine species which are attached to two sheets with *L. retusus*, Jack, from which they differ entirely in habit, in the texture form and colour of the leaves, and in the unibracteate and scurfy much shorter flowers. The specimens of *L. retusus* are flowerless.

Sect. VI. **Tolypanthus.** *Flowers* in involucrate fascicles, 1-bracteate, ebracteolate; bracts much broader than the flowers, free or connate into a bell-shaped involucre.

44. **L. involucratus,** *Roxb. Fl. Ind.* i. 552, ii. 188, and *Ed. Carey & Wall.* ii. 208; puberulous, leaves opposite and alternate long-petioled elliptic ovate or cordate obtuse, involucre of 4 ovate free bracts in a whorl equalling the 4 laxly villous sessile flowers, calyx-limb 4-lobed, corolla ½ in., tube straight cleft to the middle into 5 linear lobes with recurved tips. *DC. Prodr.* iv. 298; *Wall. Cat.* 501; *Griff. Notul.* iv. 632.

SIKKIM HIMALAYA, alt. 2–3000 ft., *J. D. H.*, *Clarke.* ASSAM, CACHAR, SILHET and KHASIA MTS., *Wallich*, *Griffith*, &c.

Branches slender, young tomentose, old woody terete with dark-brown smooth bark and large lenticels. *Leaves* 4–7 in., thin, almost membranous, base acute, nerves very slender; petiole ½–1 in. *Clusters of flowers* solitary or fascicled, sessile or shortly peduncled; bracts leafy, ½ in. *Calyx-tube* oblong, limb cleft to the base. *Corolla-tube* rather inflated below, lobes recurved for about half their length. *Filaments* shorter than the oblong-linear anthers. *Style* very stout, stigma large, capitate, obscurely lobed. The var. *hebecladus*, Wall., has no characters that I can recognize.

45. **L. Gardneri,** *Thwaites Enum.* 133; very stout, glabrous, leaves opposite and alternate petioled ovate or oblong obtuse, involucre of 5–6 ovate free bracts in a whorl much shorter than the 5–6 glabrous sessile flowers, calyx-limb truncate, corolla ¾ in., tube straight cleft into 5 linear-oblong lobes recurved above the middle.

CEYLON; at Hantane, alt. 3000 ft., *Gardner.*

Branches very stout; bark smooth, red-brown, lenticels few. *Leaves* 3–4 in., coriaceous, greenish-brown above, red-brown beneath; midrib strong, nerves slender; petiole ¼–½ in. *Clusters of flowers* sessile on the branches; bracts ¼–½ in., obtuse, nerves reticulate. *Ovary* very short; calyx-limb annular, thickened. *Corolla-tube* straight, glabrous, not dilated, sometimes bilabiate, lobes ¼ the length of the tube. *Filaments* subulate, as long as the linear-oblong caducous anthers; stigma capitate. *Fruit* (young), ellipsoid.

46. **L. lageniferus,** *Wight Ic.* t. 306; glabrous, leaves opposite or alternate shortly petioled orbicular or oblong base rounded acute or cordate, involucre large bell-shaped 5-lobed of 5 connate bracts much shorter than the 5 glabrous or hoary sessile flowers, calyx-limb 5-toothed, corolla 1½–2 in., lobes 5 very short oblong-lanceolate. *Grah. Cat. Bomb. Pl.* 86; *Dalz. & Gibs. Bomb. Fl.* 110; *Hook. Ic. Pl.* t. 229, 230.

Hills of the CONCAN, *Graham*, *Law.* MALABAR, *Wight.*

Branches stout or slender; bark dark brown, smooth, lenticels few large. *Leaves* 3–4 in., rather thin, and shining above, with short petioles and cordate or rounded bases in *Malabar specimens*, more *oblong* and coriaceous with acute bases in Concan ones; petiole ⅛–⅓ in. *Involucres* 1–1½ in., shortly peduncled; lobes short unequal, triangular-ovate; flowers subsessile. *Ovary* very short, quite glabrous. *Calyx-limb* minute, sharply toothed. *Corolla* narrow, straight, slightly dilated in the middle, suddenly contracted at the base of the lobes, which are ⅓ the length of the tube. *Filaments* subulate; anthers linear-oblong, caducous. *Stigma* capitate.

Sect. VII. **Macrosolen.** *Flowers* large, racemose or subspicate, bracteate and 1–2-bracteolate; bract small, shorter than the ovary; bracteoles often connate in a cup. *Corolla* 5–6-cleft.

47. **L. retusus,** *Jack in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 212; quite glabrous, leaves opposite and alternate shortly petioled obovate elliptic orbicular or cuneate very thickly coriaceous obtuse or retuse, bract and bracteoles minute, flowers in very short axillary few-fld. racemes, calyx-limb obsolete, corolla straight tube slightly dilated cleft to the middle into 5 linear-lanceolate lobes. *DC. Prodr.* iv. 296; *Wall. Cat.* 504, *in part.* Macrosolen retusus, *Miq. Fl. Ind. Bat.* i. pt. 1, 828. Elytranthe retusa, *G. Don Gen. Syst.* iii. 425.

Singapore, *Jack, Wallich,* &c. Malacca, *Griffith, Cuming,* &c.—Distrib. Java, Borneo.

Branches stout, terete, brown. *Leaves* 3–4 by 1–4 in., sometimes obcordate, pale greenish above and shining a little when dry, pale brown beneath; midrib stout, nerves slender; petiole very stout, ⅛–⅓ in. *Racemes* ½ in., peduncle and pedicels ⅛–⅙ in., spreading, quite glabrous. *Ovary* ovoid. *Corolla* not split dorsally, pale rose; lobes rather shorter than the tube. *Anthers* very slender, longer than the filament. *Stigma* capitate. *Fruit* globosely ovoid.

48. **L. trigonus,** *Wight & Arn. Prodr.* 386; quite glabrous, branchlets very robust triquetrous, leaves very large thickly coriaceous opposite or whorled in threes broadly elliptic obtuse, flowers in short axillary and cauline racemes or cymes, bracts connate in a small cup, calyx-limb cupular truncate, corolla-bud ⅓ in. terete clavate 5-merous.

Travancore; at Quilon, *Wight.* South Concan; Belgaum, on the highest point of the N.E. Hills, *Ritchie.* N. Canara, *Talbot.*

Branches terete, as thick as the middle finger; branchlets with the flat or concave faces ⅓ in. broad, smooth. *Leaves* 4–6 in., often as broad, brown and opaque when dry, base acute or rounded, nerves distinct; petiole very stout, ⅓–¾ in. *Flowers* in clustered cymes or racemes, 1–1½ in.; peduncle and pedicels very stout, angled when dry; bracts forming a shallow oblique cup. *Fruit* ⅓ in., ellipsoid, crowned by the cupular calyx-limb.—A very remarkable species, of which flowers are much wanted; the two localities assigned to this species are so widely apart in position and otherwise as to require confirmation; possibly two species are hence indicated.

49. **L. Brandisianus,** *Kurz in Journ. As. Soc.* 1871, ii. 63, and *For. Fl.* ii. 317; quite glabrous, leaves subopposite petioled elliptic-lanceolate caudate-acuminate, flowers 1–1½ in. in short axillary racemes or cymes, bract and bracteoles connate below acute, calyx-limb truncate, corolla straight 6-angled in bud, tube urceolate below cleft to the middle into 6 linear reflexed lobes.

Martaban Hills, alt. 3000 ft., *Brandis.* Moulmein, *Parish.*

Branches terete, bark pale. *Leaves* 3–7 in., firmly coriaceous, base acuminate, greenish when dry and shining above, yellowish brown beneath, midrib strong, nerves very faint; petiole ⅓–½ in. *Flowers* "usually in a 1–2-fld. raceme terminated by a cyme of 3–4 flowers," *Kurz*; peduncle and pedicels very stout; corolla-tube rather stout in bud, with a ridge at the base of the lobes; buds stout, glabrous, clavate above the middle, very coriaceous.

50. **L. hypoglaucus,** *Kurz in Journ. As. Soc.* 1872, ii. 309, and *For. Fl.* ii. 318; quite glabrous, leaves subopposite lanceolate or elliptic-lanceolate acuminate glaucous beneath, flowers 1–1¾ in. 2–3-nate on short crowded axillary peduncles, bract and bracteoles minute connate below, calyx cylindric limb entire truncate, corolla-tube curved slightly dilated below deeply 6-cleft, lobes linear.

Drier hill forests of MARTABAN, alt. 5–6000 ft., *Kurz*.

Leaves 2½–3 in., tapering into the short petiole, nerves obscure. *Flowers* bright crimson; bract and bracteoles triangular-ovate.—Character from Kurz; I have seen no specimens.

51. **L. formosus,** *Blume Bijd.* 660; and *Fl. Javæ, Loranth.* t. 15; glabrous, leaves subopposite ovate to elliptic-oblong acuminate or cuspidate shining on both surfaces, flowers 2–3 in. in few-fld. hoary axillary cymes, bract and bracteoles minute, calyx-limb obscurely toothed, corolla-tube very long subinflated, lobes 6 linear. *DC. Prodr.* iv. 297; *Kurz For. Fl.* ii. 317. Macrosolen formosus, *Miquel Fl. Ind. Bat.* i. pt. 1, 827. Elytranthe formosa, *Don Gen. Syst.* iii. 426.

BURMA; "in Tenasserim?" *Kurz*.—DISTRIB. Java.

Branches terete or obscurely 4-angled. *Leaves* 4–6 in., coriaceous, base obtuse or acute, nerves obscure; petiole very short, thick. *Flowers* crimson, pedicelled; bract and bracteoles 3-gonous. *Ovary* oblong. *Corolla-tube* a little curved, lobes greenish. *Anthers* linear.—I have seen no Indian specimens; the description is from Kurz.

52. **L. ampullaceus,** *Roxb. Fl. Ind.* ii. 189, and *Ed. Carey & Wall.* ii. 209; quite glabrous, leaves all opposite petioled elliptic-ovate oblong or lanceolate subacute or acuminate polished above, nerves distinct, flowers 3–7 ½–⅔ in. in short axillary glabrous racemes, calyx-limb entire, corolla-tube oblong 6-angled inflated below, lobes 6 linear-spathulate as long as the tube, fruit ellipsoid. *DC. Prodr.* iv. 296; *Kurz For. Fl.* ii. 316; *Wall. Cat.* 502. L. pallens & carinatulus, *Wall. Cat.* 523, 529; *DC. l. c.* 296, 297. Macrosolen? pallens, *Miq. Fl. Ind. Bat.* i. pt. 1, 831.

From BENGAL, ASSAM and the KHASIA MTS. to PENANG, MALACCA and SINGAPORE.

Branches stout or slender, pale; bark smooth or lenticellate. *Leaves* 3–5 by 1½–2½ in., very coriaceous, base acute rarely rounded, nerves spreading; petiole ⅛–¼ in. *Racemes* very variable, with 3–6 pairs of flowers and a terminal one; peduncle solitary or few in a cluster, rarely 1 in. long; pedicels 0–⅛ in.; bract sometimes half the length of the ovary; bracteoles smaller, connate. *Corolla* greenish yellow; bud straight, bottle-shaped, with prominent angular shoulders. *Fruit* "long oval smooth yellow the size of a currant," *Roxb.*—I have difficulty in distinguishing this from the following; some Mergui specimens have large leaves rounded at the base of a golden colour when dry. Some Malaccan ones have longer and very slender peduncles and pedicels. There is no named specimen of *L. carinatulus* in Wallich's Herbarium, but good ones were distributed to Hooker and Bentham; they do not differ at all from *ampullaceus*.

53. **L. globosus,** *Roxb. Fl. Ind.* i. 550, ii. 187, and *Ed. Carey & Wall.* ii. 206 (*excl. cit. Rheede*); quite glabrous, leaves all opposite (rarely alternate or 3-nately whorled) petioled elliptic-lanceolate subacute or acuminate, nerves very obscure, flowers 3–7 in axillary glabrous racemes pedicelled ⅛–½ in., calyx-limb entire, corolla-tube oblong 5–6-angled inflated, lobes 5–6 linear-spathulate as long as the tube, fruit globose. *DC. Prodr.* iv. 297; *Kurz For. Fl.* ii. 315; *Wall. Cat.* 6870. L. subglobosus, *Wall. Cat.* 538; *DC. l. c.* 297; *Kurz l. c.* 316. L. oleoides, *DC. l. c.* L. olei-

folius, *Wall. Cat.* 524. L. viridiflorus, *Wall. in Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 219; *Wall Cat.* 512. L. sphærocarpus, *Blume Bijd.* 661, and *Fl. Jav. Loranth.* t. 17; *DC. l. c.* 297. Macrosolen sphærocarpus & oleoides, *Miq. Fl. Ind. Bat.* i. 1. 830, 831. Elytranthe sphæroidea, *Don Gard. Dict.* iv. 127.

TROPICAL HIMALAYA; Nepal, *Wallich.* Sikkim, alt. 1–4000 ft., *J. D. H.* BENGAL, CACHAR, KHASIA MTS., PEGU, PENANG and MALACCA.—DISTRIB. Java.

I very much doubt this being anything but a form of *L. ampullaceus*, from which it differs in the narrower nerveless leaves and (according to description) in the globose fruit. Indeed Roxburgh's own specimens (in Herb. Bentham) do not agree with his drawing or description, and are certainly *L. ampullaceus*. Roxburgh describes the flowers as greenish orange, but his figure represents them with a pink corolla-tube and yellow lobes. Kurz says greenish orange with yellow tips, as does Clarke. Kurz says that the nerves become visible in a dry state. The Plate of Rheede (x. t. 5) quoted by Roxburgh and others for *L. globosus* cannot belong to that plant, which is not a native of Malabar; it is too rude for determination.

Sect. VIII. **Elytranthe.** *Flowers* few, large, crowded, decussately arranged on very short spikes which are sessile, or terminate very stout axillary peduncles. *Bracts* and *bracteoles* subequal, large, coriaceous, at length deciduous. *Calyx-limb* tubular, truncate, quite entire. *Corolla* tubular or funnel-shaped, 5–6-cleft.

* *Bracts and bracteoles orbicular, shorter than the calyx.*

54. **L. loniceroides,** *Linn. Sp. Pl. Ed.* 2. 473 (*excl. syn. Pluk.*); quite glabrous, leaves all opposite petioled oblong-ovate or -lanceolate acuminate, spikes few-fld. terminating short stout axillary peduncles, bract and bracteoles orbicular sheathing the base of the ovary, corolla 1–2 in. narrowly funnel-shaped curved, lobes 5–6 linear-oblong or -spathulate. *DC. Prodr.* iv. 299; *Roxb. Fl. Ind. Ed. Carey & Wall.* 216; *Wight & Arn. Prodr.* 382; *Wight Ic.* t. 303; *Dalz. & Gibs. Bomb. Fl.* 110; *Thwaites Enum.* 133; *Wall. Cat.* 506 A. L. umbellatus, *Heyne in Roth Nov. Sp.* 192; *DC. l. c.* 316. L. macrophyllus, *Zenk. Pl. Ind.* t. 16.

DECCAN PENINSULA; from the Concan to Travancore, ascending to 6000 ft. in the Nilghiris. CEYLON, in the Central Province, alt. 4–7000 ft.

Branches stout, terete; bark pale, warted. *Leaves* 2–5 by 1½–2 in., thickly coriaceous, nerves spreading; petiole ¼–½ in. *Peduncles* solitary or crowded, very robust, ⅓–½ in. long, 2–6 fld.; bracts shorter than the ovary, very coriaceous, obtuse or subacute, keeled. *Calyx-tube* twice as long as the ovary, truncate, cylindric, quite entire. *Corolla* red, thickly coriaceous, very variable in length, split ¼ way down. *Anthers* slender, multilocellate. *Fruit* ellipsoid.—*L. coriaceus*, Desv. in Lam. Encycl. iii. 597 (cited under this by De Candolle and others), is quite another plant, a native of Bourbon.

55. **L. capitellatus,** *Wight & Arn. Prodr.* 382; quite glabrous, leaves all opposite petioled oblong-ovate or lanceolate acuminate, spikes subsessile or on very short stout axillary peduncles, bracts and bracteoles orbicular sheathing the base of the ovary, corolla ¼–⅔ in. usually straight funnel-shaped cleft to or below the middle into 5–6 linear or spathulate lobes. *Wight Ic.* t. 304; *Dalz. & Gibs. Bomb. Fl.* 109; *Thwaites Enum.* 133. L. ampullaceus, *Wall. Cat.* 506 B.

DECCAN PENINSULA; from the Concan southwards. CEYLON, ascending to 3000 ft.

Thwaites suspects this to be a variety of *L. loniceroides*, and he is probably right, for except the short straight corolla and usually very short peduncle of the flower, I find little to distinguish it.

56. **L. psilanthus**, *Hook. f.*; quite glabrous, robust, leaves all opposite petioled ovate-oblong or -lanceolate acute or acuminate, spikes few-fld. terminating long stout axillary peduncles, bracts decussately opposite and bracteoles orbicular sheathing the base of the ovary, corolla 1–1½ in. very slender curved tubular, lobes 6 very slender. Loranth. No. 71, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA and Mishmi Hills, *Griffith*. KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c.

Very near *L. loniceroides*, and perhaps a form of that plant, but more robust, with usually larger longer-petioled leaves, longer peduncles often 1 in. long, and very slender corollas bright red with yellow almost filiform lobes.

** *Bract and bracteoles oblong, longer than the calyx.*

57. **L. albidus**, *Blume Bijd.* 665; quite glabrous, leaves all opposite petioled ovate or oblong obtuse, spikes 2–6-fld. terminating stout axillary peduncles, bracts oblong twice as long as the calyx, corolla 1–1½ in. tubular curved, lobes 5–6 short oblong. *DC. Prodr.* iv. 299. L. leucosiphon, *Griff. Notul.* iv. 623, and *Ic. Pl. Asiat.* t. 619–623. Elytranthe albida, *Blume Fl. Jav.* t. 22; *Miquel Fl. Ind. Bat.* i. pt. 1, 832.

TENASSERIM; at Mergui, *Griffith*. MALACCA, *Griffith, Maingay*.—DISTRIB. Java, Sumatra, Borneo.

A large shrub, branches terete, bark pale. *Leaves* 2–3 by 1–1½ in., moderately coriaceous, rarely cordate, nerves many spreading; petiole ¼–¾ in., rather slender. *Peduncles* ¼–½ in., solitary or fascicled; bracts ½ in. long, very coriaceous, concave, keeled, obtuse or subacute; bracteoles as long, opposite, narrower. *Calyx-tube* short, truncate, quite entire. *Corolla* constricted above the ovary, then rather swollen, mouth constricted, white, with pale pink limb. *Filaments* subulate.

58. **L. Maingayi**, *Hook. f.*; branchlets and inflorescence rusty-pubescent, leaves opposite shortly petioled elliptic or obovate obtuse, flowers capitate decussately inserted on a short stout sessile rachis and concealed by the obtuse bracts, corolla ¼ in. quite glabrous funnel-shaped regularly cleft into 6 linear recurved lobes longer than the tube.

MALACCA, *Maingay*.

Branches terete, smooth, as thick as a duck's quill, without lenticels; nodes distant, thickened. *Leaves* 2–3 in., coriaceous, midrib strong beneath, nerves very slender, base acute; petiole ¼ in., slender. *Inflorescence* of scurfy heads sessile at the nodes, solitary or fascicled, about ¾ in. long, formed of about 4 pairs of decussate broadly oblong obtuse caducous imbricating bracts, each at the base of a perfectly glabrous sessile flower; rachis of the inflorescence very stout, 4-sided, deeply excavated opposite the flowers. *Ovary* very short; calyx-limb cupular. *Corolla* coriaceous, lobes spreading. *Filaments* linear, anthers oblong. *Stigma* capitate.—The specimen is a solitary one; so allowances must be made for the description. It is closely allied to *L. Arnottianus*, Korth., of Sumatra, which has acute bracts.

DOUBTFUL AND EXCLUDED SPECIES.

L. BIFLORUS, *Desrouss. in Lamk. Encycl.* iii. 600; *DC. Prodr.* iv. 302; *Wight & Arn. Prodr.* 386, is probably one of the forms of *L. Scurrula*.

L. CORIACEUS, *Desrouss.*, which is cited by authors as a synonym of *L. loniceroides*, L., is a very different plant, a native of Bourbon.

L? FIRMUS, *Wall. Cat.* 6874, is *Henslovia umbellata*, Bl.

L. KANNELI, *Schult. Syst. Veg.* vii. 153; *Wight & Arn. Prodr.* 387; *Rheede Hort. Mal.* x. t. 5, is undeterminable.

L. LAMBERTIANUS, *Schult. Syst.* vii. 118; *DC. Prodr.* iv. 317, is probably *L. pentapetalus*, Roxb., if from Nepal, which is doubtful.

L. MITCHELII, *Wall. Cat.* 6865, from Madras, is an *Olax*, probably *O. Wightiana*.

L. OBOVATUS, *Griff. Notul.* iv. 622, from Malacca, is apparently near *L. globosus*, differing in the cuneate-obovate leaves.

L. PUNICEUS, *Wall. Cat.* 522, from Penang, consists of a few detached alternate lanceolate finely acuminate coriaceous leaves, and a few detached small ellipsoid fruits: it is undeterminable. Wallich says it is like his *L. erythrostachys* (*L. pentandrus*, L.) of Nepal.

L. RUGULOSUS, *Heyne in Roth Nov. Sp.* 194; *DC. Prodr.* iv. 317; *Wight & Arn. Prodr.* 386, from the Deccan, is undeterminable. It is no doubt a *Cichlanthus*.

L. SERRULATUS, *Roxb. in Steud. Nomencl.* Nothing is known of this.

L. SIAMENSIS, *Kurz For. Fl.* ii. 320, is a Siam plant allied to *L. pentandrus*.

L. TURBINATUS, *DC. Prodr.* iv. 305; *Wight & Arn. Prodr.* 386, from the Nilghiris, is altogether doubtful. Wight and Arnott say that but for the calyx being unequally 4-cleft, it would be referred to a glabrous var. of *L. buddleioides*, Desr. (*Scurrula*, L.).

L. VISCIFOLIUS? *Wight in Wall. Cat.* 6865, is in too imperfect a state for determination. It was communicated by Wight to Wallich, and is probably *L. recurvus*, Wall. I find nothing more like it amongst Wight's plants. The exact locality is Cumbum in the Nilghiris, Jany, 1827.

2. VISCUM, *Linn.*

Leaves opposite, often reduced to scales. *Flowers* unisexual, small or minute, solitary or fascicled in the axils of the leaves or at the nodes of the branches, rarely terminal. *Perianth-tube* of the male solid, of the female adnate to the ovary; limb 3–4-partite, segments usually deciduous. *Anthers* broad, sessile, adnate to the perianth-lobes, opening by many pores. *Ovary* inferior; stigma sessile or subsessile, large, pulvinate. *Fruit* succulent, pericarp full of viscid matter. *Embryo* in fleshy albumen, solitary or 2 in each seed.—Species about 30, temperate and tropical.

* *Branches dichotomous, leafy, or the lower whorled. Flowers fascicled, terminal in the forks of the branches. Perianth-lobes deciduous.*

1. **V. album,** *Linn. Sp. Pl.* 1023; branches terete, leaves obovate-cuneate tip rounded, flowers in sessile or shortly peduncled cup-shaped bracts. *Boiss. Fl. Orient.* iv. 1068; *DC. Prodr.* iv. 278; *Brand. For. Fl.* 392; *Kurz For. Fl.* ii. 323. V. stellatum, *Don Prodr.* 142; *DC. l. c.*; *Wall. Cat.* 490.

TEMPERATE HIMALAYA; from Kashmir to Nepal, alt. 3–7000 ft.—DISTRIB. Westward to the Atlantic, N. Asia to Japan.

A large green bush, branches jointed. *Leaves* sessile, very coriaceous, flat, 1–2 in. long, broad or narrow, obscurely 3–5-nerved. *Flowers* diœcious, sessile, 3–5 in a cluster, bracts concave. *Perianth-segments* 3–4, triangular, thick, acute, deciduous. *Fruit* white, ¼–⅓ in. long, ellipsoid.—*Mistletoe.*

** *Branches dichotomous leafy* (*or leaves* 0 *in.* V. ramosissimum). *Flowers in axillary sessile or peduncled fascicles. Perianth-lobes deciduous.*

2. **V. monoicum,** *Roxb. Fl. Ind.* iii. 763; branches terete, leaves shortly petioled obliquely ovate or falcate acute or acuminate 3–5-nerved, flowers monœcious in axillary sessile or shortly peduncled fascicles, bracts cuspidate, fruit oblong. *DC. Prodr.* iv. 278; *Brandis For. Fl.* 393; *Kurz For. Fl.* ii. 324; *Wight & Arn. Prodr.* 379 (under *V. orientale*); *Griff. Notul.* iv. 637, and *Ic. Pl. Asiat.* t. 631. V. falcatum, *Wall. Cat.* 492; *DC. l. c.* V. benghalensis, *Roxb. mss.* ? V. confertum, *Roxb. l. c.*

SIKKIM HIMALAYA, alt. 2–4000 ft., *J. D. H.* KHASIA MTS., alt. 0–3000 ft., *Wallich*, &c. GANGES DELTA, *Roxburgh.* OUDE, *Vicary.* MARTABAN and TENASSERIM, *Kurz.* NILGHIRI or KURG HILLS, *G. Thomson.*

A large shrub. *Leaves* rather thin, 1–5 in. long, very variable in breadth, nerves often strong. *Flowers* 1–3, minute, greenish, the lateral usually female, central male or absent, sometimes appearing spicate from terminating leafless shoots. *Perianth-segments* 4, triangular-oblong. *Fruit* the size of a pea truncate smooth "yellowish," Kurz, "blackish brown," Brandis.—Much of the above description is taken from Kurz. I follow Wight and Arnott in regarding Roxburgh's *V. confertum* from Silhet as probably the same.

Var.? *Edgeworthii*; branches more robust, leaves very thickly coriaceous sometimes 2½ in. broad and 7-nerved.—Banda, on *Zizyphus*, *Edgeworth.*—This may be a different species.

3. **V. verruculosum,** *Wight & Arn. Prodr.* 379; branches terete opposite and whorled, leaves petioled obovate oblong or rounded obtuse or acute base cuneate 3–5-nerved, peduncles axillary 3-fid., flowers monœcious, fruit linear-oblong warted. V. monoicum ? *Wight in Wall. Cat.* 6875.

DECCAN PENINSULA; on the Dindygul Hills, alt. 2500 ft., *Wight.*

Branches rather slender, terete, branchlets angular. *Leaves* ½–1½ in., black when dry, not thickly coriaceous. *Flowers* as in *V. orientale*, of which it is (as suggested by Wight and Arnott) perhaps a variety, but according to Wight the fruit is very different, being long slender and warted. Thwaites unites it with *orientale*, but gives no reason.

4. **V. orientale,** *Willd. Sp. Pl.* iv. 737; branches terete or angled and grooved opposite and whorled, leaves petioled from obovate to elliptic oblong and linear oblong obtuse 3–5-nerved, base narrowed or rounded, flowers few or many in sessile or peduncled clusters monœcious, fruit globose smooth. *DC. Prodr.* iv. 278; *Wight & Arn. Prodr.* 324; *Brand. For. Fl.* 393; *Kurz For. Fl.* ii. 324; *Blume Fl. Jav. Loranth.* t. 24, 25; *Benth. Fl. Austral.* iii. 396; *Miquel Fl. Ind. Bat.* i. pt. 1, 804; *Wall. Cat.* 491. V. verticillatum, *Roxb. Fl. Ind.* iii. 764. V. Heyneanum, *DC. l. c.* V. indicum, *Rottl. mss.*

BENGAL, BEHAR, and CHITTAGONG, and thence southward to SINGAPORE and TRAVANCORE. CEYLON; Central Province, ascending to 7000 ft.—DISTRIB. Malay Islands, China, New Guinea, Australia.

A rather large much-branched shrub, black or brown when dry; branches often very slender, branchlets angular. *Leaves* rarely more than 1 in., often unequal. *Flowers* minute, rarely more than 5. *Flowers* as in *V. foliatum*, but perianth usually 3-cleft. *Fruit* the size of a pea (Kurz), "purple, copiously minutely dotted," W. & A.—I cannot distinguish between specimens with deeply grooved and angled branches, and those with terete ones, there are so many intermediates.

5. **V. orbiculatum,** *Wight Ic.* t. 1016, and *Spec. Neilgherr.* t. 86; branches and branchlets acutely angled and deeply grooved, leaves petioled elliptic oblong or rounded much waved obtuse 3–5-nerved, flowers 3–5 in sessile or peduncled axillary clusters, fruit oblong rounded at both ends.

NILGHIRI HILLS, *Wight, Herb. Hohenack.*

I doubt this being anything but a form of *V. orientale* with the main branches angled and grooved and leaves much waved.

6. **V. ovalifolium**, *Wall. Cat.* 489; branches stout terete, leaves petioled very coriaceous elliptic or oblong rarely ovate obtuse 3–5-nerved, flowers diœcious ? crowded in axillary sometimes spicate clusters, perianth 4-lobed, fruit oblong-ovoid. *DC. Prodr.* iv. 278; *Kurz For. Fl.* ii. 325. V. obtusatum, *Wall. Cat.* 494; *DC. l. c.*

TENASSERIM, *Griffith, Lobb*, &c. ANDAMAN ISLANDS, *Kurz*. MALACCA, *Griffith* (*Kew Distrib.* 2739), *Maingay* (*Kew Distrib.* 696). PENANG, *Wallich*.—DISTRIB. China, Ava.

This resembles a very large stout form of *V. orientale* with larger very thickly coriaceous leaves 2–4½ in. long, and more numerous flowers clustered at the axils and nodes. *Perianth* 4-merous.—*V. ovalifolium* (and *V. obtusatum*) are reduced to varieties of *V. orientale* by Miquel, *Fl. Ind. Bat.* i. pt. 1, 805, perhaps correctly.

7. **V. capitellatum**, *Sm. in Rees Cycl.* xxxvii; dwarf, branches short terete very stout, leaves shortly petioled ovate obovate spathulate or orbicular concave above obscurely 3-nerved tip rounded base cuneate upper smaller linear-oblong, flowers 3–6 terminating solitary fascicled or whorled peduncles, fruit ovoid. *DC. Prodr.* iv. 279; *Wight & Arn. Prodr.* 330. V. mangiferæ, *Wight in Wall. Cat.* 6878. V. verticillatum, *Herb. Rottl.*

DECCAN PENINSULA; from Canara at Sindole, *Ritchie*, southwards. CEYLON, common, *Thwaites*.

A small species, forming much-branched tufts 6–10 in. long and broad, often parasitic on other *Loranthaceæ*. *Leaves* ½–1 in. long, and often as broad, apparently sometimes wanting. *Peduncles* very variable in length, ½ in. or less; bracts rounded.

8. **V. ramosissimum**, *Wall. Cat.* 6876; branches terete very long and slender, leaves 0 or very few sessile petioled obovate or linear-oblong or cuneate tip rounded base cuneate obscurely 3-nerved, flowers 1–3 minute sessile, fruit subglobose minute. *Wight & Arn. Prodr.* 380.

DECCAN PENINSULA; on the Ghats and low grounds, from the Concan southwards. ? SINGAPORE, *Murton*. CEYLON; on Rhododendron at Maturata, *Trimen*.

Branches 10–18 in. long, striate; internodes 1–2 in. long, nodes hardly swollen, not contracted. *Leaves* 1 in., coriaceous, only one or two pairs at the bases of the main branches in a few specimens, the majority are leafless. It is not easy to distinguish some specimens of this from *V. angulatum*. The Singapore specimens are imperfect; if not *ramosissimum*, they are probably an undescribed species.

*** *Leafless. Perianth-lobes deciduous.*

9. **V. angulatum**, *Heyne mss.*; *DC. Prodr.* iv. 283; leafless, branches angled long and slender nodes not swollen or contracted, flowers very minute sessile solitary or whorled at the nodes, perianth-lobes deciduous. *Wight & Arn. Prodr.* 380; *Dalz. & Gibs. Bomb. Fl.* 110; *Benth. Fl. Austral.* iii. 396; *Miquel Fl. Ind. Bat.* i. pt. 1, 806; *Wall. Cat.* 497. V. attenuatum, *Herb. Hohen.* n. 1478. V. ramosissimum, *Wight Ic.* t. 1017.

DECCAN PENINSULA; on the Ghats and low grounds, from the Concan southwards.—DISTRIB. Java, Australia.

Habit of *V. ramosissimum*, but never so slender as that sometimes is, and always leafless as far as is known; main stem terete, branches acutely 4-angled or (when dry) many-angled below.

10. **V. articulatum,** *Burm, Fl. Ind.* 311; leafless, branches flattened, internodes 1–2 in. striate and furrowed when dry contracted at the nodes, flowers very minute fascicled in cup-shaped bracts at the tops of the internodes, perianth-lobes deciduous. *DC. Prodr.* iv. 284; *Miquel Fl. Ind. Bat.* i. pt. 1, 806; *Kurz For. Fl.* ii. 325. V. attenuatum, *DC. l. c.*; *Wight & Arn. Prodr.* 380; *Brand. For. Fl.* 394. V. moniliforme, *Blume Bijd.* 667, and *Fl. Jav. Loranth.* t. 25 B; *DC. l. c.* V. fragile, *Wall. Cat.* 498. V. compressum, *Poir. Encycl. Suppl.* ii. 861; *DC. l. c.*; *Blume Fl. Jav. Loranth.* t. 24. V. fragile, *Wall. mss. in DC. l. c.* V. aphyllum, *Griff. Notul.* iv. 634, and *Ic. Pl. Asiat.* t. 630.

SUBTROPICAL HIMALAYA; from Chamba, ascending to 3000 ft., eastward to Sikkim. ASSAM, MISHMI and the KHASIA MTS., ascending to 6000 ft., and southward to TRAVANCORE, MALACCA and CEYLON.—DISTRIB. Malay Islands.

A pendulous much di-tri-chotomously branched green shrub, yellow or black when dry; internodes very variable in length and breadth, 1–2 by $\frac{1}{16}$–$\frac{1}{3}$ in. *Flowers* few or numerous in the cup-shaped bracts, 3–4-merous, arranged in depressed 3-fid. spikes, of which the lateral flowers are usually male; males with reflexed perianth-lobes; females bibracteolate, with erect deciduous perianth-lobes. *Fruit* subglobose, yellow, smooth.—I think there can be no doubt of this common plant being Burmann's *V. articulatum* and Blume's *V. moniliforme*, which latter name is usually given to *V. japonicum*. There are two states of it.

V. ARTICULATUM *proper*; more slender, internodes rarely $\frac{1}{8}$ in. broad.

Var. *dichotoma*, Kurz For. Fl. ii. 325; much stouter, internodes thicker and broader often $\frac{1}{4}$ in. broad. V. dichotomum, *Don Prodr.* 147; *DC. Prodr.* iv. 284. V. elongatum, *Wall. Cat.* 495; *DC. l. c.* V. nepalense, *Spreng. Syst., Cur. Post.* 47. V. opuntioides, *Roxb. Fl. Ind.* iii. 764; *Wall. Cat.* 496. Viscum sp., *Griff. Notul.* iv. 636, and *Ic. Pl. Asiat.* t. 632.—Common in the Himalaya, Khasia Mts., the higher hills of Pegu, and the Deccan Peninsula.—Harvey (*Fl. Cap.* ii. 581) gives this as a native of South Africa, but describes the fruit as mostly warted, which is not the case in the Indian plant.

**** *Leafless. Perianth-lobes persistent.*

11. **V. japonicum,** *Thunb. in Trans. Linn. Soc.* ii. 329; a small tufted leafless species, branches flattened contracted at the nodes, internodes $\frac{1}{4}$–1 in. long, flowers very minute fascicled in cup-shaped bracts at the tips of the internodes, perianth-lobes persistent. *DC. Prodr.* iv. 283. V. Opuntia, *Thunb. Fl. Jap.* 64. V. articulatum, *Miquel Prol. Fl. Jap.* 297; *Franch. & Sav. Enum. Pl. Jap.* i. 406; *Maxim. Diagn.* xx. 616; *Benth. Fl. Hongk.* 141, and *Fl. Austral.* iii. 396. V. tænioides, *Comm. in Thou. Mel. Obs.* 43; *DC. l. c.* 283; *Baker Fl. Maurit.* 135. V. moniliforme, *Wight & Arn. Prodr.* 380; *Wight Ic.* t. 1018, and *Spic. Neelgherr.* t. 87; *Kurz For. Fl.* ii. 325 (*not of Blume*). V. articulatum, *Brand. For. Fl.* 393. V. Wightianum, *Wall. Cat.* 6877 (*not of Wight & Arn.*).

TEMPERATE HIMALAYA; from Murree to Kumaon, alt. 5–7000 ft. KHASIA MTS., alt. 4–5000 ft. MALACCA, on Mt. Ophir. NILGHIRI MTS., ascending to 7000 ft., *Wight*, &c. CEYLON, in the most elevated parts of the Central Province.—DISTRIB. Mauritius, China, Japan, Australia.

Much smaller than *V. articulatum*, erect, rarely 6 in. high, usually densely tufted, very variable in the breadth of the internodes. *Inflorescence* as in *V. articulatum*, but perianth-segments (3–4) persistent. *Fruit* $\frac{1}{10}$ in. long, ellipsoid.—This very distinct species is usually referred to the Javanese *V. moniliforme*, Blume. Of this last I have seen no authentic specimens, but its author describes it as abundant at Buitenzorg, where *V. japonicum* is not likely to be found. I have seen no Javanese specimens of *V. japonicum*, and it is not described in Miquel's Flora. Miquel, rightly no doubt, refers Blume's *moniliforme* to *articulatum*, which is very common in Java. Wallich's No. 6877 consists of several fragments of this, but there has been accidentally fastened on the same sheet a scrap apparently of *V. orientale*.

Var. *coraloides*, Wight Ic. t. 1019; diœcious, branchlets narrower, all female.—Nilghiri Hills, abundant, *Wight* (who states that he has never found male flowers).

DOUBTFUL AND EXCLUDED SPECIES.

V. GROSSUM, *Wight in Wight & Arn. Prodr.* 380; *Wall. Cat.* 6879.—Wight and Wallich's plants consist of nothing but fragments of branchlets resembling those of *V. album*. The flowers are described as fascicled at the nodes, but there are none in the specimens. It is a native of the Dindygul Hills in the Southern Carnatic.

V.? HETERANTHUM, *Wall. Cat.* 488; *DC. Prodr.* iv. 279 (V. latifolium, *Ham. in Don Prodr.* 142. V. platyphyllum, *Spreng. Cur. Post.* 47; *DC. l. c.*), is *Henslovia heterantha*, Hook. f. & Thoms.

V. WALLICHIANUM, *Wight & Arn. Prodr.* 379 (*excl. syn. V. Wightianum*); stem and branches terete, whorled opposite or dichotomously, nodes swollen leaves 2–2½ in. flat very stoutly petioled very thick and coriaceous oblong obscurely 3-nerved base cuneate, flowers unknown.—There is a scrap of this in Wight's Herbarium without locality; it a good deal resembles *V. album*, but is, I think, distinct. There are also fragments of it in Wallich's Herbarium, fastened on the sheet with *V. Wightianum*, Wight & Arn. (not Wallich), and numbered 491, which is *V. orientale*, a very different plant.

V. WIGHTIANUM, *Wight & Arn. Prodr.* 380 (*not of Wallich*); stem and branches terete whorled or dichotomous, nodes thickened, leaves 2–2½ in. very coriaceous subsessile broadly elliptic rounded at both ends tip rounded grey and opaque when dry nerves very obscure, flowers unknown.—Apparently a very distinct species, of which there are fragments in Wight's Herbarium without locality, and in Wallich's mixed with *V. Wallichianum*.

2. ARCEUTHOBIUM, *Rich.*

Minute green leafless parasites, with the leaves reduced to opposite scales in which the very minute ebracteolate diœcious? solitary flowers are sunk. *Perianth* as in *Viscum*, but 2–5-partite, and always persistent. *Anthers* globose, bursting transversely.—Species 5–6, S. Europe, W. Asia, N. America.

A. minutissimum, *Hook. f.*; stem none but the inconspicuous stock that ramifies within the bark and which the minute branches perforate but scarcely rise above the surface, appearing as a 2-lipped cup, male fl. sessile in the cup 3–5-partite, fem. fl. pedicelled.

KUMAON HIMALAYA, alt. 10,700 ft., on Pinus excelsa, *Duthie*.
The most minute dicotyledonous plant that I can call to mind.

3. NOTOTHIXOS, *Oliv.*

Dichotomously branched parasitic hoary or tomentose shrubs. *Leaves* opposite, flat, coriaceous. *Flowers* minute, monœcious, in unisexual heads, or spikes, like those of *Viscum*, but the subsessile anthers are broad, erect, many-celled and lobulate? and dehisce by pores or a transverse slit at the apex.—Species 4, a Cingalese and three Australian.

N. floccosus, *Oliv. in Journ. Linn. Soc. Lond.* vii. 104; densely woolly tomentose, branched, leaves orbicular or broadly ovate obtuse, flowers spicate, anthers bursting by many pores. Viscum floccosum, *Thwaites Enum.* 418.

CEYLON; in the Ambagamowa and Ratnapoora Districts, *Thwaites*.
Much branched; branches slender, young tomentose. *Leaves* ¼–¾ in. long,

petioled, ovate, 3-nerved and transversely veined, coriaceous, glabrous above with sunk nerves, beneath densely clothed with ochreous woolly tomentum; petiole ⅛–¼ in., woolly. *Flowers* few, terminal in short spikes. *Anthers* 3-celled and lobed. *Perianth-lobes* 3–4, triangular, acute, persistent. *Style* very short, conical. *Fruit* ovoid, white, ¼ in. long.—Hardly generically separable from *Viscum*, but the habit and woolliness are those of *Notothixos*.

4. GINALLOA, *Korth.*

Parasitic very slender glabrous shrubs, with the habit of the leafy Viscums, but the flowers are spicate, the branches have usually a thickening at the base like a sheath, and the anthers are didymous 2-celled and open by slits lengthwise.—Species 4, Malayan.

* *Flowers in a cupular bract.*

1. **G. Helferi,** *Kurz For. Fl.* ii. 326; leaves linear-cuneate ⅙–⅓ in. diam. tip rounded or emarginate 5-nerved. Viscum Helferi, *Presl Epimel. Bot.* 256.

TENASSERIM, *Helfer.*

Leaves 3–4 in., tapering to the sessile base, thinly coriaceous. *Spikes* 1–2 in., terminal or in the forks, very slender. *Flowers* minute; perianth-segments 3, triangular, acute. *Anthers* large, sessile.

2. **G. spathulifolia,** *Oliv. in Journ. Linn. Soc.* vii. 103; leaves linear or narrowly linear-spathulate ⅛–⅙ in. diam. nerves very obscure. Viscum spathulifolium, *Thwaites Enum.* 136.

CEYLON; on Adams Peak, *Gardner, Thwaites.*

Leaves 2–3 in., tapering to the sessile base, thinly coriaceous, tip obtuse or retuse. *Spikes* 1–2 in., terminal and in the forks, very slender. *Perianth-segments* 3, triangular, at length deciduous. *Ovary* narrowly oblong. *Fruit* ellipsoid, nearly ⅛ in. long.

** *Flowers sunk in the fleshy rachis of the spike.*

3. **G. andamanica,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 309, and *For. Fl.* ii. 326; leaves thickly coriaceous petioled obovate or obovate-oblong obscurely 3–5-nerved.

SOUTH ANDAMAN ISLAND, *Kurz.*

A rather large parasite; stem terete, dichotomously branched. *Leaves* 1¼–2 in. long, tip rounded; petiole very short, stout, flat. *Spikes* 1–4 in., robust, terminal and in the forks. *Flowers* minute, clustered, diœcious?, surrounded with a thin dilatation of the rachis; perianth-segments 3, triangular. *Fruit* (unripe) elongate.—I have seen no specimens.

ORDER CXXXIII. SANTALACEÆ.

Trees, shrubs or herbs. *Leaves* alternate or opposite, quite entire, sometimes scale-like or 0, exstipulate, nerves inconspicuous. *Inflorescence* various; flowers inconspicuous, green, usually bracteate and bracteolate, regular, 1–2-sexual. *Perianth* superior or inferior, 3–8-toothed -lobed or -partite; lobes with often a tuft of hair behind the anthers. *Stamens* 3–6, inserted on the lobes above rarely on the base of the perianth and opposite them; anthers 2-celled. *Disk* various, epigynous or perigynous. *Ovary* inferior (superior in *Champereia*), 1-celled; style usually short, stigma entire or 3–6-lobed;

ovules 2–3, adnate to, or pendulous from, a central column (solitary and basal in *Champereia*). *Fruit* a nut or drupe. *Seed* globose or ovoid; testa thin or obsolete; albumen copious, fleshy; embryo usually terete.—Genera 28, species 220, temperate and tropical.

TRIBE I. **Thesieæ.** *Perianth* ½-superior, tube adnate to the base of the ovary, and usually produced above it. *Disk* 0. *Fruit* a very small nut.

Flowers spicate . . . . 1. THESIUM.

TRIBE II. **Osyrideæ.** *Perianth* superior, tube adnate to the ovary, not produced above it. *Fruit* a drupe.

* *Anther-cells distinct, parallel.*

Stamens with interposed processes. Leaves alternate . . . . 2. PYRULARIA.
Stamens with interposed processes. Leaves opposite . . . . 3. SANTALUM.
Stamens without interposed processes. Leaves alternate . . . . 4. OSYRIS.

** *Anther-cells divergent or confluent.*

Parasitic shrubs. Flowers minute, cymose or fascicled . . . 5. HENSLOVIA.
Leaves alternate. Filaments 2-fid . . . . 6. SCLEROPYRUM.
Small leafless parasitic shrubs . . . . 7. PHACELLARIA.

TRIBE III. **Anthoboleæ.** Perianth inferior, 3–4-partite. *Ovary* superior or immersed in the disk. *Ovule* 1, erect.

Flowers in slender axillary panicles, very minute . . . . 8. CHAMPEREIA.

1. THESIUM, *Linn.*

Slender perennial herbaceous root-parasites, rarely annual or shrubby. *Leaves* alternate, narrow, decurrent, 1–3-nerved. *Flowers* minute, greenish, solitary and axillary or in 2-chotomous cymes, 2-sexual. *Perianth* adnate to the ovary, tube produced above it; lobes 5, rarely 4, with a tuft of hair on the face. *Stamens* 5–4, inserted at the base of perianth-lobes, included. *Ovary* inferior; style short or long, stigma capitate or lobulate; ovules 2–3, pendulous from a basal free often flexuous or crumpled column. *Fruit* a sinuate drupe or nut, often ribbed. *Embryo* terete.—Species about 100, temperate and tropical; all but 2 Brazilian species are natives of the Old World.

I have no sufficient materials for discriminating the Himalayan plants of this most troublesome genus, which I provisionally include under *T. himalense*, itself probably a widely distributed W. and N. Asiatic plant, possibly also European.

1. **T. himalense,** *Royle Ill.* 322; stems procumbent or suberect very slender, leaves bracts and bracteoles linear, nut ellipsoid or globose its nerves rather faint crowned by the narrower perianth-tube with linear incurved lobes. *Edgeworth in Trans. Linn. Soc.* xx. 88; *A. DC. Prodr.* xiv. 645. T. multicaule, *Herb. Ind. Or. H. f. & T.*, ? of *Ledeb.*

WESTERN HIMALAYA; from the Chenab Valley to Kumaon, alt. 5–7000 ft., *Royle*, &c.

Very closely allied to *T. multicaule*, but very much more slender, and usually procumbent. *Stem* 6–18 in. *Leaves* scattered, 1–2 by $\frac{1}{10}$–$\frac{1}{8}$ in., 1-nerved. *Perianth* glabrous; lobes bearded within, obtuse. *Style* often exserted, stigma capitate.

Nut $\frac{1}{8}$ in., with faint but distinct raised nerves and reticulations.—There appear to be several varieties of this plant, approaching *T. divaricatum*, *T. montanum*, and various other Oriental and Siberian species, which should probably all be united, for their characters are very vague.

Var.? 1; perianth-lobes much shorter broadly ovate, nut more globose.—Garwhal, on the Niti Pass, alt. 11,5000 ft., *Strachey & Winterbottom.* Tibet, *Heyde.*—A more alpine plant than *T. himalense* proper, and possibly *T. alatavicum*, Kar. & Kir.

Var.? 2; stems slender straggling and much branched, the branches divaricate, leaves very much more slender, flowers minute.—North-West Himalaya, at Vatar, *Brandis*; Garwhal, *Strachey & Winterbottom* (Thesium 2).

Var. 3? *pachyrhiza*; stems very numerous procumbent from (in the Tibetan [illegible]

[illegible] perianth-lobes.—Heights above Kiong, *Thomson.* Sikkim, at Lungu, [illegible] *J. D. H.*—I think this is nothing but a state of *T. himalense*, with a very old rootstock; the form of the nut is so variable as to afford no distinctive character, and its nervation is that of the other forms included under *himalense.*

2. **T. Wightianum,** *Wall. Cat.* 4037; stems numerous branching from the base procumbent leafy, leaves very many uniform linear-lanceolate acute tips often bleached, bract and bracteoles hardly longer than the globose reticulated 10-nerved nut which is crowned by the short incurved perianth-lobes. *A. DC. Prodr.* xiv. 647; *Wight Ic.* 1852 (*exclude fig. of anthers*). T. nilagiricum, *Miquel in Analect. Mel.* iii. 15; and in *Hohenack. Pl. Ind. Or.* No. 973.

NILGHIRI HILLS, *Wight*, &c. Conoor, alt. 7–7500 ft., *Clarke.*—DISTRIB. Abyssinia?

Branches straggling, sometimes a foot long. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ by $\frac{1}{12}$ in., almost acuminate, rather fleshy. *Flowers* axillary, solitary or 2-nate, minute, sessile. *Stamens* glabrous. *Style* short, stigma capitate. *Nut* $\frac{1}{10}$ in. diam., with prominent longitudinal nerves and impressed reticulations.

DOUBTFUL SPECIES.

THESIUM sp.? from Murgulla, in the Salt Range, *Vicary.*—Apparently a tall very slender erect species, with long branches, scattered leaves, and the inflorescence and flowers of the common forms of *P. himalense*. It is perhaps *T. multicaule*, Ledeb.

2. PYRULARIA, *Michaux.*

Trees or shrubs. *Leaves* alternate, deciduous, membranous. *Flowers* polygamous, axillary or in terminal cymes, bracteolate. *Perianth-tube* solid in the male, in the fem. adnate to the ovary; lobes 5, valvate, hairy on the face. *Stamens* 5, inserted at the bases of the perianth-lobes with the anthers adhering to the hairs. *Disk* of scales between the stamens. *Ovary* inferior; style columnar, stigma capitate; ovules 2–3, pendulous from a free short straight basal column. *Drupe* large, pyriform, obovoid or globose. *Seed* globose; embryo short, subterete, near the top of the albumen.—Species 2, a Himalayan and N. American.

P. edulis, *A. DC. Prodr.* xiv. 628; leaves ovate oblong or elliptic-oblong acuminate young with long hairs beneath, male fl. in hirsutely tomentose panicles, fem. solitary, fruit pyriform. Sphærocarya edulis, *Wall. Cat.* 4033, and in *Roxb. Fl. Ind. Ed. Carey & Wall.* ii. 371, and *Tent. Fl. Nep.* 19, t. 10, copied in *Wight Ic.* t. 255; *Gamble Man. Ind. Timb.* 320. S. vestita, *Wall. Cat.* 7207.

CENTRAL AND EASTERN TROPICAL HIMALAYA; Nepal, *Wallich.* Sikkim, alt.

4–5000 ft., *J. D. H.* Mishmi Hills, in Upper Assam, *Griffith.* KHASIA MTS., alt. 4–5000 ft., *Wallich,* &c.

A large or small thorny deciduous leaved tree; branches stout, youngest villous; buds large, of pale broad silky rounded imbricating scales. *Leaves* 3–7 in., rather fleshy, rarely obovate-oblong, quite entire; nerves few, very oblique, sunk[illegible]ove, very prominent beneath, petiole ⅓–½ in. *Male racemes* 1–3 in., terminal and axillary; flowers pedicelled, about ⅙ in. diam., ebracteate. *Perianth-lobes* triangular, acute. *Fl. fem.*. *Ovary* clavate, pubescent; style short. *Drupe* 1½–2 in. long, narrowed into the stout peduncle, crowned with the perianth-lobes; epicarp tough; sarcocarp glutinous, traversed by vessels; endocarp globose.

3. **SANTALUM,** *Linn.*

Glabrous trees or shrubs. *Leaves* opposite, rarely alternate, coriaceous. *Flowers* axillary or in terminal trichotomous paniculate cymes, 2-sexual; bracts minute. *Perianth-tube* adnate to the base of the ovary, campanulate or ovoid; lobes 4, rarely 5, valvate, with a tuft of hair on the face. *Stamens* 5–4, short, united at the bases of the lobes. *Disk* of scales between the stamens. *Ovary* at first free, at length half-inferior; style elongate, stigma 2–3-lobed; ovules 2–3, inserted below the summit of a long acuminate central free column, reflexed. *Drupe* subglobose, top annulate by the deciduous perianth. *Seed* subglobose; embryo terete, slender.—Species about 8, Indian, Malayan, Australian and Pacific.

S. album, *Linn. Sp. Pl.* 497; leaves elliptic-ovate or ovate-lanceolate acute or subacute base acute, panicles terminal and lateral, pedicels about equalling the perianth-tube. *A. DC. Prodr.* xiv. 683; *Roxb. Fl. Ind.* i. 442, and *Ed. Carey & Wall.* i. 462; *Grah. Cat. Bomb. Pl.* 177; *Dalz. & Gibs. Bomb. Fl.* 224; *Brand. For. Fl.* 398; *Kurz For. Fl.* ii. 329; *Beddome Fl. Sylv.* t. 256; *Gamble Man. Ind. Timb.* 321; *Dict. Sc. Nat.* t. 5 (*except the hairs*), copied in *Spach Hist. Veg.* t. 25; *Hayne Arnz. Gewachs.* x. t. 1; *Bentl. & Trimen Med. Pl.* iii. t. 292; *Griffith in Trans. Linn. Soc.* xviii. 59, t. 1–3; *Bot. Mag.* t. 3235. S. myrtifolium, *Roxb. Fl. Ind.* i. 444, and *Ed. Carey & Roxb.* i. 464. S. verum, *Linn. Mat. Med.* 102. Sirium myrtifolium, *Roxb. Cor. Pl.* i. t. 2; *Fleming in As. Research.* xi. 181 (Syrium). Sandalum album, *Rumph. Amb.* ii. 42, t. 11.—Chandana, *Jones in As. Research.* iv. 253.

DECCAN PENINSULA; from near Poona on the west and Midnapoor on the east, southwards, on dry hills, ascending to 3000 ft.; cultivated elsewhere.

A small evergreen glabrous tree. *Leaves* opposite, 1½–2 in. long, pale brown when dry, thin, narrowed into a slender petiole ⅓–½ in., glaucous beneath; nerves faint. *Racemes* much shorter than the leaves, pedicels opposite; flowers ⅙ in. diam., at first straw-cold., then blood-red, inodorous even when bruised. *Drupe* globose, size of a cherry, black when ripe, flesh juicy; endocarp hard, with 3 short ribs from the tip downwards.—The *S. myrtifolium* of the Concan with narrower undulate leaves and less scented wood is regarded by Roxburgh as a very distinct species, and by De Candolle as a variety. Brandis, however, unites them, and I follow him as the latest Indian authority. Roxburgh's dried specimens show no character.

4. **OSYRIS,** *Linn.*

Glabrous shrubs; branches angular. *Leaves* alternate. *Flowers* small, axillary, solitary or cymose, polygamous. *Perianth-tube* solid in the male fl., in the fem. adnate to the ovary; lobes 3–4, triangular, valvate, with a tuft of hair on the face. *Stamens* 4–5, short, inserted at the base of the lobes; anther-cells separate. *Disk* angled between the stamens. *Ovary* inferior; style short or long, stigma 3–4-fid.; ovules 2–4, pendulous from a short stout central placenta. *Drupe* globose or ovoid. *Seed* globose; embryo terete or with cotyledons dilated.—Species 5 or 6, S. European, African and Indian.

O. arborea, *Wall. Cat.* 4035; leaves subsessile elliptic-lanceolate -oblong or -obovate mucronate acute or acuminate base acute, male cymes in axillary peduncled clusters umbels racemes or fascicles, fem. subsolitary (1–3) on long slender pedicels, drupe subglobose. *A. DC. Prodr.* xiv. 633; *Brand. For. Fl.* 399. O. Wightiana, *Wall. Cat.* 4036; *Wight Ic.* t. 1853; *Grah. Cat. Bomb. Pl.* 177; *Dalz. & Gibs. Bomb. Fl.* 223; *A. DC. l. c.*

SUBTROPICAL HIMALAYA; from Simla to Bhotan (exclusive of Sikkim), ascending to 7000 ft. DECCAN PENINSULA; on the Ghats, from the Concan southwards. CEYLON; in the Central Province, alt. 4–6000 ft.

A glabrous (except var. β) shrub or small tree, black when dry; branches acutely angled, tips puberulous. *Leaves* 1–2 rarely 3 in. long, very variable in breadth, thickly coriaceous, midrib and nerves prominent beneath, or the latter faint. *Flowers* very minute. *Drupe* yellow, $\frac{1}{4}$–$\frac{1}{3}$ in. diam.

Var. *puberula,* branchlets and leaves beneath finely puberulous.—Nilghiri Hills, *Jerdon*; at Conoor, alt. 6000 ft., *Beddome.* Central Province, *Thompson* (*Brandis*).—I have not seen specimens of this variety from the Central Province. The Sindh? plant (no doubt from Beluchistan) collected by Stocks, cited as the same by Brandis, appears to me to be a very different species.

5. HENSLOVIA, *Blume.*

Parasitic shrubs with spreading, erect or twining branches. *Leaves* alternate, thickish. *Flowers* very minute, monœcious or diœcious, axillary or the females with stamens; males subracemose or capitellate; fem. solitary or few and clustered. *Perianth-tube* of male 0, of fem. adnate to the ovary globose ovoid or oblong; lobes 5–6, valvate. *Stamens* 5 or 6, inserted at the base or middle of the lobes, short, 0, or reduced to staminodes in the female fl.; anthers didymous, with a few long soft hairs at the back. *Disk* concave or convex. *Ovary* inferior; stigma subsessile, discoid or lobed; ovules 2–3, pendulous from the top of a stout central column. *Drupe* ovoid, obovoid, ellipsoid or subglobose; inner wall of hard endocarp protruded as 5–10 hard vertical plates into deep fissures of the stellately lobed seed. *Embryo* linear.—Species about 12, Indian, Malayan and Chinese.

The characters of the 12 species described in the Prodromus, and which are chiefly taken from Blume (*Mus. Bot. Lugd. Bat.* i. 243), are utterly insufficient, and from the imperfection of specimens I am at a loss to identify the Indian satisfactorily with the Archipelagan species. *H. heterantha,* Vidal Sinops. Fam. y. Gen. Plant. Filip. t. 82, F, is *Exocarpus latifolia,* Br.

1. **H. granulata,** *Hook. f. & Thoms. Herb. Ind. Or.*; branches pustulate, flowers sessile on the top of very short clustered peduncles which are clothed with imbricating rounded bracts, the 4–5 upper of which form a spreading involucre, males numerous, females 1 or few, fruit small obovoid, pyrene 5-furrowed. *A. DC. Prodr.* xiv. 632; *Kurz For. Fl.* ii. 328.

EASTERN HIMALAYA; Sikkim and Bhotan, alt. 4–7000 ft., *Griffith* (*Kew Distrib.* 4389), *J. D. H.* KHASIA MTS., alt. 5–6000 ft., *J. D. H. & T. T.*

A small parasitic shrub, with erect and spreading stout branches. *Leaves* 1–2 in. long, from obovate to roundly spathulate, contracted into a distinct petiole, 5–9-nerved. *Clusters of peduncles* very numerous, $\frac{1}{16}$–$\frac{1}{8}$ in. long; bracts with membranous subciliate margins, upper largest. *Flowers* quite sessile; perianth 5-lobed;

females without stamens. *Stigma* pulvinate, sessile, obscurely lobed.—I find no difference between A. De Candolle's var. *Sikkimensis* and the Khasia plant. The bracts are not more than half a line long (about $\frac{1}{24}$ in.).

2. **H. heterantha,** *Hook. f. & Thoms. in Herb. Ind. Or.*; branches smooth or sparingly pustulate, flowers sessile on the top of very short solitary or clustered peduncles which are bracteate at the base and tip only, the bracts at the tip forming a spreading involucre, males numerous, females 1 or few, fruit small elliptic-oblong, pyrene 5–6-furrowed. *A. DC. Prodr.* xiv. 632 (*excl. syn. H. frutescens*); *Kurz For. Fl.* ii. 328. ? H. umbellata, *Blume Mus. Bot.* i. 243; *A. DC. l. c.* 630. Viscum ? heteranthum, *Wall. Cat.* 488; *DC. Prodr.* iv. 279. V. latifolium, *Ham. in Don Prodr.* 142; *DC. l. c.* V. platyphyllum, *Spreng. Cur. Post.* 47.

CENTRAL and EASTERN HIMALAYA; Nepal, *Hamilton, Wallich.* SIKKIM, alt. 2–5000 ft., *J. D. H.* ? PEGU and MARTABAN, alt. 4–7000 ft., *Kurz.*—DISTRIB. ? Java.

A small parasitic shrub, with erect and spreading rough usually pale-brown branches, often minutely pustular. *Leaves* very variable, elliptic ovate or rounded, 1–4 in. long, sometimes as broad and orbicular, 5–9-nerved, narrowed into the petiole. *Flowers* about the size of *H. granulata*; females without or with very imperfect stamens; stigma very shortly 5-lobed, subsessile. *Fruit* red, tasting of *Pyrus aucuparia* in Sikkim ($\frac{1}{3}$ in. long and less); yellow in the Martaban plant, *Kurz.*—Kurz describes two varieties from Martaban, *heterantha* proper, with 5-merous sessile or subsessile flowers, and *coriacea* with 6-merous shortly-pedicelled flowers. The Hong Kong *H. frutescens*, Benth., united with *heterantha* by A. DC., is, I think, different, having fewer nerves, a much larger fruit, and pedicelled male flowers: it is described as terrestrial.

Var. ? *sessiliflora*; flowers quite sessile.—Khasia Mts., on Oaks near Nowgong.

3. **H. Lobbiana,** *A. DC. Prodr.* xiv. 631; branches terete twining smooth or faintly granulate, male flowers very minute few spicate, towards the tips of short strict clustered peduncles which are bracteate only at the base and under each flower, females on short fascicled bracteate pedicels, fruit globose or shortly oblong, pyrene nearly smooth obscurely 5–7-furrowed, stigma stellately 5-lobed.

PENANG, *Lobb.*; on the top of Government Hill, *Maingay* (*Kew Distrib.* No. 1315), *Curtis.* MALACCA, *Griffith, Maingay* (*Kew Distrib.* 1313).

A creeper according to Maingay, some of the branches of whose specimens are twining. *Leaves* from obovate-spathulate to orbicular, very coriaceous, dark brown when dry. *Peduncles* of male spikes $\frac{1}{6}$–$\frac{1}{3}$ in. long; flowers sessile or very shortly pedicelled, $\frac{1}{30}$ in. diam., subglobose. *Pedicels* of female $\frac{1}{12}$–$\frac{1}{20}$ in. long, bracts very minute in both sexes. *Perianth-tube* of female longer than the pedicel; lobes 5, each with a stamen.—I have described this from Lobb's specimens (No. 334), which are from Penang (not Singapore), as are those of Maingay and Curtis. I do not find the leaves to be punctato-verrucose beneath as described by A. De Candolle, nor the perianth-lobes as pilose.

4. **H. varians,** *Blume Mus. Bot. Lugd. Bat.* i. 244, t. 43; branches terete twining nearly smooth, male fl. racemose or clustered on stout peduncles which are bracteate at the base and under each flower, females fascicled pedicelled, fruit shortly ellipsoid, endocarp 5-furrowed and rugose. *A. DC. Prodr.* xiv. 631. ? H. philippinensis, *A. DC. l. c.* Dendrotrophe varians, *Miq. Fl. Ind. Bat.* i. 780.

TENASSERIM; Mergui, *Griffith* (*Kew Distrib.* 4390, 4392). MALACCA, *Maingay* (*Kew Distrib.* 1316/2), ? *Cuming* (No. 2255).—DISTRIB. Borneo.

Very closely allied to *H. Lobbiana*, but the leaves are much paler when dry, with usually a more slender petiole, the male flowers are larger and more racemose, i.e. longer pedicelled, and the common peduncle is longer; the females also are longer pedicelled, and have longer bracts, the stigma is very obscurely lobed, not stellately rayed as in *Lobbiana*. The female flowers of the Tenasserim specimens have very minute imperfect anthers, those of Borneo, as figured by Blume, have perfect ones. The Malaccan plant of Cuming described by A. De Candolle as *H. philippinensis*, is from Malacca; it has very slender male racemes, and may be Blume's *H. spicata*, which according to De Candolle differs in the 6-merous perianth (a character of no value) and glandular flowers. My Bornean specimens of *varians* are very insufficient. Maingay's has leaves 4 by 2–3 in.

5. **H. buxifolia**, *Blume Mus. Bot. Lugd. Bat.* i. 244; branches smooth terete spreading and twining, flowers minute bisexual on short simple pedicels or sessile on branched few-fld. very short peduncles which are 2–4-bracteate under the flower, fruit minute globose 4–6-furrowed and rugose, stigma discoid lobed subsessile. *A. DC. Prodr.* xiv. 631. Dendrotrophe buxifolia, *Miquel Fl. Ind. Bat.* i. 781. Osyris rotundata, *Griff. Notul.* iv. 742, and *Ic. Pl. Asiat.* t. 627, f. 11.

MALACCA; in littoral woods, *Griffith* (*Kew Distrib.* 4391), *Cuming* (No. 2366).—DISTRIB. Borneo.

Habit of *H. Lobbiana*, but the flowers are in much shorter branched peduncles, apparently all hermaphrodite, with very small lobes, the fruit is not ¼ in. diam., and the stigma more shortly lobed. Griffith describes the ovules as 5.

DOUBTFUL SPECIES.

H. ERYTHROCARPA, *Kurz in Trimen Journ. Bot.* xiii. (1875) 329; branches striate, leaves oval or oval-oblong narrowed into a broad petiole 3-nerved very obtuse 1½–2½ in. long coriaceous opaque glabrous, veins distinct above invisible beneath, fruits 1–4 in the leaf axils subelliptic-globose size of a large pea orange yellow smooth shortly stipitate.—On trees in woods of Kamorta, Tenasserim, *Kurz*.

HENSLOVIA sp., Tenasserim or Andamans, *Helfer* (*Kew Distrib.* 4393); leaves rounded 3–5-nerved, petiole short broad, fruit subglobose ⅓ in. long, endocarp rugose.

HENSLOVIA sp., Mt. Ophir, Malacca, *Maingay* (*Kew Distrib.* 1314); leaves very coriaceous broadly oblong, petiole short stout, fruit globose ¾ in. long stipitate smooth or nearly so, with many locelli.

6. SCLEROPYRUM, *Arnott.*

Trees, often spiny. *Leaves* alternate, coriaceous. *Flowers* in short catkin-like spikes at the leafless nodes, polygamous. *Perianth-tube* of male solid, of fem. adnate to the ovary; lobes 5, valvate or subimbricate. *Stamens* 5, inserted at the bases of the lobes short, filaments 2-fid; anther-cells separate, dehiscing transversely. *Disk* annular. *Ovary* inferior; style short, stout, stigma large peltate; ovules 3, pendulous from the top of a central column. *Drupe* pyriform, pedicelled. *Seed* subglobose; embryo terete.—Species 2, Indian.

1. **S. Wallichianum**, *Arn. in Jard. Mag. Zool. & Bot.* ii. (1858) 550; a spinous glabrous tree except the finely tomentose inflorescence, leaves elliptic ovate or oblong obtuse, perianth-lobes imbricate. *Wight Ic.* t. 241. Sphærocarya Wallichiana, *Wight & Arn. in Ed. Phil. Journ.* xv. (1832) 180. Pyrularia Wallichiana and P. ceylanica, *A. DC. Prodr.* xiv. 629; *Beddome For. Fl.* t. 304. ? Champereia Perrottetiana, *Baill. Adans.* iii. 125.—*Rheede Hort. Mal.* iv. t. 18 (fem.), and vii. t. 30 (male).

DECCAN PENINSULA; on the Western Ghats, from the Concan southwards, as-ending to 5000 ft. in Coorg. CEYLON, in the Central Province, alt. 4–6000 ft., *Walker*, &c.

Branches very stout and woody, bark pale. *Leaves* 3–6 in., penninerved, and 3-nerved at the base, which is sometimes cordate; petiole $\frac{1}{4}$ in. *Racemes* 1–2 in. long, the rachis and peduncle stout, of female thickening much after flowering; bracts minute; flowers reddish. *Perianth* $\frac{1}{10}$ in. diam.; segments ovate, subacute, distinctly imbricate, with one outer, all with a tuft of hairs behind the stamens. *Fruit* 1 in. long including the very stout pedicel, crowned with the persistent perianth.—Wight figures the leaves as sometimes cordate, upon which A. De Candolle founds his var. *Bertii*, quoting under it "S. Wallichianum, *Bertie in Wight Ic.* t. 241;" but Wight quotes Arnott as the author both of the genus and species, and I do not find any reference to the name Bertie in Wight or elsewhere. I have referred with doubt Baillon's *Champereia Perrottetiana* to this plant, of which it may be an unarmed flowering specimen with an occasionally 4-merous flower.

2. **S. Maingayi**, *Hook. f.*; unarmed (always ?) glabrous, except the finely tomentose inflorescence, leaves oblong or ovate obtuse, perianth-lobes valvate. ? Pyrularia moschifera, *A. DC.*; *Benth. in Gen. Plant.* iii. 228.

MALACCA; *Maingay.*

"A medium-sized tree," *Maingay*, resembling *S. Wallichianum* in habit and foliage, but the branches are unarmed, the flowers smaller, and the perianth-segments strongly valvate. Bentham in Gen. Plant. refers this doubtfully to *Sphærocarya moschifera*, Blume Mus. Bot. i. 245 (*Pyrularia moschifera*, A. DC.), a plant I have not seen, but which is described as having leaves acuminate and pubescent beneath, and in which the stamens are not described as bifid. *P. moschifera* is more probably a true *Sphærocarya*.—I have seen no fem. fl. or fruit of Maingay's plant.

DOUBTFUL AND EXCLUDED SPECIES.

SPHÆROCARYA LEPROSA, *Dalzell*, is *Strombosia ceylanica*; see Vol. I. 579.

7. PHACELLARIA, *Benth.*

Small leafless parasitic shrubs, stems fascicled. *Flowers* minute, scattered on the branches, solitary or fascicled, sessile or sunk in the branch, ebracteate, monœcious. *Perianth-tube* of male solid, of fem. adnate to the ovary; lobes 4–8, short, valvate. *Stamens* 4 or 5, inserted on the bases of the lobes, filament short thick; anther-cells diverging below. *Disk* flat. *Ovary* inferior; style short, stout, stigma entire or 3-lobed; ovules 3, pendulous from and appressed to the top of a conical central column. *Fruit* unknown.—Species 3, Indian.

The species of this genus should be described from specimens in a living state, or preserved in spirits.

1. **P. rigidula**, *Benth. in Gen. Plant.* iii. 229; quite glabrous, stems rigid terete crowded in a tuft on a small stock simple or sparingly branched, perianth 4–5-cleft.

TENASSERIM; at Mergui, parasitic on a *Loranthus*, *Griffith* (*Kew Distrib.* 2745).

Stems 4–6 inches long, strict, rather slender; branches alternate, ascending, short. *Flowers* scattered along the branches, $\frac{1}{16}$ in. diam.; males subglobose, lobes broadly triangular; females with a longer tube.

2. **P. compressa**, *Benth. in Gen. Plant.* iii. 229; stems very stout scaberulously puberulous quite simple, perianth 5–8-cleft.

TENASSERIM; at Moulmein, *Parish.*

Stems fewer from the stock than in *P. rigidula*, and quite simple, much stouter, flowering almost from the base, when dry $\frac{1}{8}$ in. diam., described by Bentham as compressed, but fresh specimens are necessary to confirm this. *Flowers* smaller even than in *P. rigidula*, with the lobes often cleft to the base.

3. **P. Wattii**, *Hook. f.*; hoary, stems much branched, branches stout, flowers clustered, perianth 5-cleft.

MANIPUR; on the mountains, alt. 7500 ft., *Watt*, growing on *Loranthus*.

Stems 4–8 in. long, about $\frac{1}{8}$ in. diam., flexuous. *Flowers* larger than in the two former species, sometimes crowded in globose masses, hoary.

8. CHAMPEREIA, *Griff.*

Glabrous shrubs or small trees. *Leaves* alternate. *Flowers* minute, in 3–5-fld. axillary panicled cymes, 2-sexual (always?); bracts minute or 0. *Perianth* inferior; segments 5, valvate. *Stamens* 5, perigynous, filaments longer than the perianth, filiform; anther-cells parallel. *Disk* shortly 5-lobed between the stamens. *Ovary* superior, half immersed in the disk; stigma sessile, broad; ovule solitary, erect in the centre of the cell. *Drupe* ellipsoid, pedicelled. *Seed* conform to the drupe; embryo terete, radicle superior clavate.—Species 1 or 2, Malayan.

C. Griffithiana, *Planch. in Herb. Hook.*; leaves oblong or oblong-lanceolate acute or acuminate, male panicles very slender often exceeding the leaves. *Kurz For. Fl.* ii. 330 (*Griffithii*).—Champereia, *Griff. in Calc. Journ. Nat. Hist.* iv. 237.

TENASSERIM, and the ANDAMAN ISLANDS, *Griffith* (*Kew Distrib.* 4388), &c. MALACCA and PENANG, *Griffith*, *Maingay* (*Kew Distrib.* 375, 1316).

A small tree; branches slender, bark very pale. *Leaves* 3–6 in., coriaceous, ovate-oblong or lanceolate, very pale when dry, nerves slender; petiole $\frac{1}{4}$ in. *Male panicles* almost thread-like; flowers pedicelled, $\frac{1}{12}$ in. diam. *Fruiting panicles* with stout branches. *Drupe* $\frac{1}{2}$ in. long, bright red, very shortly stoutly pedicelled, quite smooth, tip rounded.—*Opilia manillana* and *Cumingiana* of Baillon (Adansonia, iii. 125), are very closely allied plants.

ORDER CXXXIV. BALANOPHOREÆ.

Low fleshy leafless or scaly brown, reddish or yellow, root-parasites, without stomates. *Flowers* monœcious or diœcious, small or minute, crowded on spadix-like peduncled heads or cones; peduncles very stout, simple, annual or arising from an amorphous tuberous or a branching annual or perennial rootstock. MALE FL. *Perianth* 0, or of 3–8-valvate lobes. *Stamens* 1–2 in the naked flowers; in the flowers with a perianth as many as its lobes and opposite them or more, filaments 0, or fleshy, free or connate in a column or tube; anthers free or connate, 2-many-celled, opening by pores or valves, or bursting irregularly. FEM. FL. *Perianth* 0, or confluent with the ovary; limb 0, or minutely toothed. *Ovary* 1–3-celled; styles 1–2 or 0, stigmas simple or capitellate, rarely pulvinate and sessile; ovule 1 in each cell, usually pendulous from the top, anatropous or atropous, naked or with a single integument, or reduced to an embryo-sac. *Fruit* minute, crustaceous or coriaceous, 1-seeded. *Seed* usually adherent to the pericarp, testa very thin or 0 rarely thick, albumen densely granular and oily, rarely floury; embryo most minute, undivided.—Genera 14; species about 40, tropical or subtropical.

TRIBE. **Eubalanophoreæ.** *Perianth* of male fl. 3–6-lobed, of female 0. *Stamens* connate in a column. *Style* 1. 1. BALANOPHORA.

TRIBE. **Helosideæ.** *Perianth* of male entire or 3-lobed; of female confluent with the ovary, limb 2-lipped. *Styles* 2. 2. RHOPALOCNEMIS.

1. BALANOPHORA, *Forst.*

Glabrous fleshy herbs, with a tuberous rootstock warted with lenticels abounding in a waxy secretion. *Peduncles* bursting through the rootstock, which forms an irregularly toothed or lobed ring or short sheath at its base. *Flowers* minute, intermixed with clavate cellular bodies, (bracteoles), monœcious or diœcious. MALE FL. *Perianth* of 2–6 valvate lobes. *Stamens* 2–∞, filaments 0, or connate in a solid column; anthers free or connate. FEM. FL. *Perianth* 0. *Ovary* ellipsoid, compressed, 1-celled, narrowed into a slender style, stigma terminal; ovule 1, pendulous. *Fruit* minute, crustaceous. *Seed* globose, adhering to the pericarp, albumen oily; embryo subglobose, of 2–3-cells.—Species about 12, Eastern Asiatic, Australian and Polynesian.

* *Scales of the peduncle forming an involucre. Anthers as the perianth-lobes.*

1. **B. involucrata,** *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 44, t. 4–7; involucre of 2–4 scales connate to the middle, heads ovoid or globose. *Eichler in DC. Prodr.* xvii. 144.

TEMPERATE HIMALAYA, on the roots of various trees; Simla, alt. 6000 ft., *Thomson*; Sikkim, alt. 7–10,000 ft., *J. D. H.*

Rootstock tuberous, lobed, 3–4 in. diam. *Peduncles* stout or slender, 1–6 in. long, cylindric or compressed, rarely fascicled, involucred about the middle. *Male fl.* with the tube of the perianth sunk in cavities of the heads, usually 3-merous. *Anthers* transversely oblong, bursting by transverse apical slits. *Fem. fl.* sometimes clustered round a clavate bracteole.—In Sikkim I distinguished four forms of this.

α. *rubra*; peduncles and ovoid 2-sexual heads red.

β. *flava*; peduncles and usually unisexual heads yellow.

γ. *gracilis*; peduncles long and slender, and small unisexual heads yellow.

δ. *Cathcartii*; peduncles stout and (unisexual) heads white or yellow.

** *Scales of the peduncle scattered or imbricate. Anthers as many as the perianth-lobes.*

2. **B. dioica,** *Brown in Wall. Cat.* 7246, and in *Trans. Linn. Soc.* xiii. 227, *in note*; rootstock tuberous lobed or branched, scales of peduncle imbricate, heads cylindric usually 1-sexual. *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 45; *Eichler in DC. Prodr.* xvii. 145; *Royle Ill.* 330, t. 99 (78) *a.* B. elongata, *Scholt. & Endl. Melet.* xiii. *in part* (*not of Blume*); *Fawcett in Journ. Linn. Soc. ined.* B. Burmanniana, affinis, alveolata & picta, *Griff. in Trans. Linn. Soc.* xx. 93, 94, t. 3–6.

TROPICAL and SUBTROPICAL HIMALAYA; on roots of various trees, from Nepal to Mishmi, alt. 3–7000 ft., abundant. KHASIA MTS., alt. 4–6000 ft. BURMA, *Griffith.*

Rootstock a few inches to a foot in diameter. *Peduncles* 1–12 in., stout; scales laxly or densely imbricate, and heads white brown yellow or blood-red. *Heads* 1–3 in. long, cylindric ovoid or conoidal, females with sometimes a few male flowers at the base. *Perianth-lobes* 3–6. *Staminal column* short or long; anthers bursting by curved slits.—A very variable plant.

3. **B. indica,** *Wall. Cat.* 7247; rootstock tuberous lobed, scales of

peduncle scattered, heads obovoid or subglobose usually 1-sexual. *Weddel in Ann. Sc. Nat. Ser.* 3, xiv. 167, t. 9, f. 11–22; *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 46; *Eichler in DC. Prodr.* xvii. 145; *Fawcett in Journ. Linn. Soc. ined.* B. picta, *Miquel, Pl. Hohen.* 1272. B. gigantea, *Wall. Cat.* 7249. B. typhina, *Wall. Cat.* 7248/3. B. elongata *in part, Hook. f. l. c.* Langsdorffia indica, *Arn. in Hook. Ic. Pl.* t. 205, 206, and in *Ann. Nat. Hist.* ii. 36.

DECCAN PENINSULA; Nilghiri Mts., *Wight.* CEYLON, *Thwaites,* &c.

Rootstock very variable in size, often very large. *Peduncles* 8–12 in. high, stout (sometimes 1 in. diam.) or slender, and heads rosy, pale red brown or purplish. *Flowers* usually diœcious. *Perianth* 4–6-lobed.—Eichler has referred the Nilghiri specimen which I had assumed to be *B. elongata* to a var. (*β. minor*) of *B. indica,* on account of its having only as many anther-cells as perianth-lobes, whilst *B. elongata* has more (the number is not given for either species), and the anthers opening by longitudinal slits. Mr. Fawcett informs me that *B. gigantea* may differ from *B. indica* in the rootstock being tessellate rather than warted, and devoid of pustules.

4. **B. Thwaitesii,** *Eichler in DC. Prodr.* xvii. 146; rootstock small, peduncle a foot high clothed with oblong scales 1–2 in. long, scales imbricate oblong lacerate, male head ovoid. *Fawcett in Journ. Linn. Soc. ined.* B. indica, *Thwaites, mss.*

CEYLON; *Thwaites.*

Known only from a drawing in the Kew collection sent by Dr. Thwaites, and which represents either a gigantic male specimen of *B. indica* or a different species. The whole plant is of a dirty-yellow colour, the perianth nearly ¼ in. diam., and the oblong head of anthers ¼ in. long.

*** *Scales of peduncle imbricate. Anther-cells* 20–60.

5. **B. polyandra,** *Griff. in Trans. Linn. Soc.* xx. 94, t. 7; rootstock tuberous lobed, male-heads cylindric, female ovoid or oblong. *Hook. f. in Trans. Linn. Soc.* xxii. 30 and 47; *Fawcett in Journ. Linn. Soc. ined.* B. typhina, *Wall. Cat.* 7248 A, B.

SIKKIM HIMALAYA; on roots of trees, alt. 4–6000 ft., *J. D. H.* KHASIA MTS. *Wallich, Griffith,* &c.

General habit colour and female flowers of *B. involucrata,* differing in the many-celled head of anthers; the male flowers are the largest of the genus.

2. RHOPALOCNEMIS, *Jungh.*

A very stout glabrous diœcious fleshy herb, with a large tuberous warted lobed rootstock. *Peduncles* many, very stout, bursting through the rootstock, which forms a warted coriaceous irregularly lobed tube round their base. *Heads* cylindric; flowers at first concealed under hexagonal connate peltate bracts, intermixed with dense masses of filiform cellular processes (bracteoles or imperfect flowers). MALE FL. *Perianth* campanulate or funnel-shaped adnate below to the base of the staminal column; mouth entire. *Stamens* 3; filaments connate in a long exserted column; anthers connate, 2–4-celled, irregularly bursting at the top. FEM. FL. *Perianth* confluent with the walls of the ovary, ellipsoid, compressed; limb very short, 2-lipped; styles 2, slender; ovule 1, pendulous. *Fruit* linear or ovate-oblong, turgid. *Seed* filling the cavity of the pericarp, consisting "of a very large horny embryo covered with a unicellular layer of endosperm," *Hoffmeister.*